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UBERCULOSIS

AS A DISEASE OF THE MASSES AND HOW TO COMBAT IT

FIFTH EDITION REVISED AND ILLUSTRATED

With Supplement on Home Hygiene, School Hygiene, Installation of the Sanatorium Treatment at Home, and a Historical Review of the Anti-Tuberculosis Movement in the United States

Motto: To combat consumption as a disease of the masses successfully requires the combined action of a wise government, well trained physicians, and an intelligent people.

PRIZE ESSAY

BY

S. ADOLPHUS KNOPF, M.D., New York

Director in the National Association for the Study and Prevention of Tuberculosis; Associate Director of the Clinic for Pulmonary Diseases of the Health Department; Visiting Physician to the Riverside Sanatorium for Consumptives of the City of New York, etc.

The "International Congress to Combat Tuberculosis as a Disease of the Masses," which convened at Berlin, May 24th to 27th, 1899, awarded the International Prize to this work through its Committee on July 31st, 1900

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NEW YORK

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PREFACE TO THE GERMAN EDITION.

(By GEH. MED.-RATH PROFESSOR B. FRÄNKEL, of Berlin, Germany, setting forth the conditions under which the prize was awarded.)

AT the meeting of the "International Congress for the Study of the Best Way to Combat Tuberculosis as a Disease of the Masses" which convened at Berlin, May 24–27, 1899, the sum of 4,000 marks was donated by two Berlin merchants, lay members of the Congress, as a prize to be offered for the best essay on the subject "Tuberculosis as a Disease of the Masses and How to Combat It" ("Die Tuberkulose als Volkskrankheit und deren Bekämpfung").

The Congress decided on the following regulations concerning this prize:

1. The best popular essay on the subject "Tuberculosis as a Disease of the Masses and How to Combat It," comprising not more than eighty, and not less than forty-eight, printed pages, shall receive the prize of 4,000 marks. In case the jury of the prize committee should decide that two essays deserve the prize, the best may receive 3,000 marks, and the second best 1,000 marks. Or, should the decision of the judges find two essays of equal value, each shall receive 2,000 marks.
2. The following gentlemen have consented to act as judges: Geheimrath Prof. Dr. B. Fränkel; Geheimrath Prof. Dr. Gerhardt; Käpitan z. S. Harms; Wirkl. Geh. Ober Reg.-Rath Präsident Köhler; Generalarzt Prof. Dr. von Leuthold, Excellenz; Geheimrath Prof. Dr. von Leyden; Freiherr Dr. Lucius von Ballhausen, Excellenz; Geheimrath Dr. Naumann; Oberstabsarzt Dr. Pannwitz; Dr. Graf von Posadowsky-Wehner, Excellenz; Se. Durchlaucht der Herzog von Ratibor.

3. All essays must be sent by December 1, 1899, to Privy-Councillor Prof. Dr. B. Fränkel, 4 Bellevue Strasse, Berlin, and each essay must bear a motto, selected by the writer, who shall insert his name within a sealed envelope having the motto on the cover.
4. The essay, or essays (see § 1), to which has been awarded the prize, become the property of the "German Central Committee for the Erection of Sanatoria." The latter will take upon itself the printing of the essay and the least expensive method of distribution.
5. The decision of the judges is to be announced through the public press.

The foregoing regulations were published in the medical and lay papers, and as a result eighty-one essays were received by December 1st. The essays were distributed among the judges with the request to select from them such as were deserving of closer examination. The judges recommended twenty-six for that purpose.

The fifty-five rejected essays were once more examined by the undersigned and his assistants, Drs. Edmund Meyer, Alexander, Finder, Claus, and Elwert, but these gentlemen could not recommend any of the fifty-five essays for further consideration.

At the meeting of the jury on February 25, 1900, under the presidency of his Serene Highness the Duke of Ratibor, it was decided that the twenty-six selected essays should be once more carefully examined by Drs. Fränkel, Gerhardt, Harms, Köhler, von Leuthold, von Leyden, Freiherr von Lucius and Pannwitz, and the result was that three were ultimately selected for closer choice.

At the next meeting of the judges, on June 15th, it was decided to form a sub-committee composed of Drs. Fränkel, Gerhardt, Harms, Köhler, and Pannwitz, to decide upon final action. After careful consideration this committee came to the conclusion that the work bearing the motto,

"To combat consumption successfully requires the combined action of a wise government, well-trained physicians, and an intelligent people,"

so much surpassed all the others in excellence, that it should be

awarded the Congress prize. It was then found that Dr. S. A. Knopf, of New York, was the author of this work.

A few changes, as recommended by the judges, were accepted by Dr. Knopf, and have been incorporated in the present work.

At a subsequent meeting of the German Central Committee it was resolved to publish this essay and arrange for its widest distribution.

PROFESSOR B. FRÄNKEL.

BERLIN, October 1, 1900.

PREFACE TO THE FIRST ISSUE OF THE AMERICAN EDITION.

IN presenting to the English-speaking world, and particularly to the people of the United States, a translation of the essay, originally written in German, the author desires to state that, while having endeavored to make as exact a translation as possible, he found it necessary to change several passages, making some additions and omissions. His reasons for having done so will be obvious to all who have studied pulmonary tuberculosis or consumption, not only in its medical, but also in its sociological aspects, and who will bear in mind the fact that the habits of nations differ, and that in a popular essay it is absolutely necessary to take these differences into account. Thus it was even necessary, before the original German essay could appear in print, that the author should consent to make certain changes bearing on the particular local conditions and situation of the consumptive poor in Germany. These changes were suggested in detail by the judges who awarded the prize. With a generosity which cannot be lauded too highly, these gentlemen did not expect to find in the essays, submitted to them for competition from all over the world, a complete knowledge of the sanitary laws and regulations which are now in vogue in the German empire, nor did they expect the essayists to be familiar with local conditions to the extent of

knowing all that would or would not be practicable in the carr ing out of suggestions to prevent the spread or the development tuberculous diseases.

The social conditions in Germany differ very much from th in the United States, and the author felt it his duty to speak this American edition of all the important points bearing direc on the question of tuberculosis as a "social disease" in Ameri The evils of alcoholism, of the overcrowding of tenement hou and of unsanitary dwellings of the poor in general, also some the causes of malnutrition or underfeeding of the laboring class are treated as fully as the nature of such an essay permits.

As an example of the necessity of making certain changes this work, intended for an American public, I may be permitt to state the following: in Germany every laboring man and wo an must be insured against old age, accident, and disease, inclu ing tuberculosis, and the employer is held responsible for t compliance with this law. No such laws exist in the Unit States, where even private insurance companies will not insur tuberculous invalid. As another illustration of the vastly differe conditions here and in Germany regarding our subject, we mu consider that every one of the forty-seven States of the Union h its own sanitary laws and regulations. They differ widely in rig and completeness in regard to the prevention of tuberculosis man as well as in beast. In Germany there is one homogenec law for all the states and provinces; there is a ministry for "Medi inal Angelegenheiten" (medical affairs) with a cabinet officer the head, who has for his advisers the highest medical authorit connected with the "Reichs-Gesundheitsamt" (imperial office health). I hope the time is not far distant when our own l loved country will have similar institutions; when all the Sta county, and city boards of health will look to Washington, t seat of the future secretary of public health, as their supreme he and guide in medical and sanitary matters. In the mean time us labor as best we can; let each State, county, and city board health do its best toward an intelligent, rigorous, and yet not t oppressive public prophylaxis of bovine and human tuberculos and let the people at large lend a willing hand in this comb against our common foe, the "Great White Plague."

S. A. KNOPF, M.D.

16 WEST NINETY-FIFTH STREET, NEW YORK, January, 1901.

PREFACE TO THE FOURTH AMERICAN EDITION.

AFTER three issues of the American edition of this essay have been printed without any material change from the original translation of the German edition, I am confronted with the problem of either writing a new edition or making a supplement which will contain what is new and of interest to the Medical Profession and the Public. I have decided to present the matter in the form of a supplement which will contain what had to be left out of the original edition because the jury of the Berlin tuberculosis congress limited the number of printed pages, and also the most important things that the experience of seven more years in tuberculosis work has taught me. Thus I have added two paragraphs, one on Home Hygiene, and one on School Hygiene. An equally valuable addition I hope will be found in the chapter added on the Installation for the Sanatorium Treatment at Home. Lastly, there will be a short historical review of the anti-tuberculosis movement in the United States from its beginning to the present day.

My reason for adding these four new chapters in the form of a supplement, instead of inserting them in the text, is purely an economical one. Inserting them would increase the cost of the book materially, while by writing a supplement the book can still be sold at retail for $0.25 paperbound and $0.50 clothbound, and at wholesale correspondingly cheaper. There are enough good books on tuberculosis in the market costing $2.00, $3.00, and $5.00, intended to inform the layman; but for the masses, who need this information most, there are few at a price within their reach.

In this connection I must explain why this essay has not been published by one of the well-known firms handling medical and popular scientific books. The low price at which I insisted the book should be put on the market seemingly did not insure sufficient remuneration to the various firms to whom I applied. But I was fortunate enough to interest a former secretary of mine, Mr. Fred. P. Flori, who has undertaken the publishing and selling of the book at this low price. I desire to thank him for the interest and devotion which he has brought to the task.

I must not send out this little volume without expressing my sincerest thanks and appreciation to Drs. Barbour, Bezenseck, Björnsson, Blumenthal, Donath, Eddy, Ferriera, Galli, Hoving, Lagowsky, Lope, Massalongo, Mihailovic, Popovic, Rosendahl, Roth-Schulz, Rosal, Sersiron, Shibayama, Wender, and Zwieshon, who have honored me by translating the essay into their native languages. "Tuberculosis as a Disease of the Masses and How to

Combat it" is now printed in twenty-one different languages, thus reaching people in all parts of the civilized world.

It is particularly gratifying to me that the much needed information which this little book is intended to give, has been so far-reaching. The original German edition has been reprinted many times and largely distributed by the German Government, for which I have now a second edition in preparation. Five thousand copies of this present issue are to be sent to the Health Officers of this State for distribution. I wish to thank Dr. Eugene H. Porter, the present Commissioner of the Department of Health of the State of New York, for his efforts in causing this to be done, thus giving his official approval to the work.

May this edition meet with the same kind reception accorded to the previous editions, and may the information which the book is intended to convey be helpful to physicians and patients, teachers and parents, statesmen, employers and employees, to rich and poor, in short to all able and willing to help in the solution of the tuberculosis problem, and thus add to the health, prosperity and happiness of all the people. S. A. KNOPF, M.D.

16 WEST NINETY-FIFTH STREET, NEW YORK, April 1, 1907.

PREFACE TO THE FIFTH EDITION.

There has been of late in the United States a decidedly increased awakening in the field of the antituberculosis work. Educational propaganda, too, has received a great deal of attention. The fourth edition of this little work, which appeared in April, 1907, and of which 10,000 copies were issued, was exhausted before the year came to an end. I am deeply grateful to the Medical Profession and the Public at large for the continued kind reception of my modest contribution. The present fifth edition has been again carefully revised, changes made where that was necessary, and important events relating to antituberculosis work in the United States have been added to the historical chapter of the book.

May this edition, like its predecessors, continue to have its little share in the combat against the great white plague, and may the total eradication of this disease at last become a reality.

S. A. KNOPF, M.D.

NEW YORK, February, 1908.

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TUBERCULOSIS AS A DISEASE OF THE MASSES AND HOW TO COMBAT IT.

INTRODUCTION.

Histor
Item

TUBERCULOSIS has been called a disease of the masses on account of its great prevalence among all classes of people. It has been known for hundreds of years as the most feared, most prevalent, and, alas! also as the most fatal of all diseases. Hippocrates, the most celebrated physician of antiquity (460 to 377 B.C.), and the true father of scientific medicine, described pulmonary tuberculosis or consumption as the disease which is "the most difficult to treat, and which proves fatal to the greatest number." Isocrates, also a Greek physician, who lived about the fifth century before Christ, was the first to write of tuberculosis as a disease transmissible through contagion. In the middle ages (1550) the celebrated physician Montano declared consumption to be one of the most dangerously contagious and most easily contracted of diseases. An equally strong advocate of the theory of contagion was the celebrated anatomist Morgagni (1682–1771), who never performed an autopsy on an individual who had died from tuberculosis. Toward the end of the eighteenth century the sanitary authorities of some cities of Italy and France considered consumption a highly infectious and contagious disease, and a French medical author of the name of Janett de Langrois reports that the municipal authorities of Nancy had caused the furniture and bedding of a woman who had died from consumption, to be destroyed by fire. The contagion in this case had actually been demonstrated, inquiries revealing that the deceased woman had slept frequently with a consumptive girl friend until she finally succumbed to the same disease.

In Naples a royal decree, dated September 20, 1782, ordered the isolation of consumptives and the disinfection of their apartments, personal effects, furniture, books, etc., by means of vinegar, brandy, or lemon juice, sea-water, or fumigation. Any violation of this law was punished, if the individual was an ordinary mortal, with three years in the galleys, and if he happened to be a nobleman he was sent for the same time to the fortress and had to pay 300 ducats. The physician who failed to notify the authorities of the existence of a tuberculous patient was fined 300 ducats for the first offence, and a repetition of the neglect would banish him from the country for ten years. According to Portal (1742–1832), there was a law in Spain and Portugal which obliged the parents or nearest relative of a consumptive to notify the authorities when the patient had arrived at the last period of the disease. This was done for the purpose of making sure of the disinfection of the personal effects of the patient after his death.

In the first half of the nineteenth century little attention was paid to the infectious theory of tuberculosis even by medical men. The contagiousness or communicability of the disease could not be scientifically demonstrated, and although there were physicians here and there who believed in the infectiousness of the disease, nothing positive was taught in regard to it at the centres of medical learning.

At last, in 1865, the French physician Villemin demonstrated beyond a shadow of doubt that tuberculosis could be transmitted from one individual to another. He inoculated animals with tuberculous substances and reproduced tuberculosis not only in the lungs but also in other portions of the body. Since this discovery and its verification by numerous experimenters, such as Cohnheim, Welch, Prudden, Straus, and others, it has been generally acknowledged that tuberculosis is an infectious disease, and that for its production a specific germ is essential. The discovery of this specific organism (bacillus tuberculosis) was reserved to the great German scientist Robert Koch (1882).

Consumption is an endemic disease, that is to say, habitually prevalent, and it exists in all civilized countries. Wild tribes and less civilized people succumb to the disease, as a rule, very rapidly

CALIFORNIA
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SACRAMENTO

as soon as they come in contact with civilization. The proof of this we might find among the North American Indians and among the negroes and their descendants now living in the United States. According to the recent report of the Board of Health of Toronto (Canada), pulmonary tuberculosis is dangerously prevalent among the Blood Indians of the Dominion of Canada. Of every hundred deaths which occurred among this tribe in the year 1898, twenty-three were due to consumption. Since these Indians are kept on a reservation under the supervision of the Canadian Government, these statistics should be considered reliable.

Consumption an Endemic Disease.

The mortality from tuberculosis among the colored population of the United States is nearly twice that of the white population. However, let us state right here that the cause of this increased mortality among Indians and negroes is to be ascribed not to the blessings of civilization, but rather to the vices, such as alcoholism and excesses of all kinds, which, alas! too often accompany civilizing agents.

There have been so many statistics published concerning the general mortality from tuberculosis in the United States and Europe, that we do not think it necessary to reproduce in detail any of the published tables, but will content ourselves with some general statements. It is now universally admitted that tuberculosis is the most frequent cause of death. According to some statistics every seventh, according to others every sixth, death is due to tuberculosis in one form or other. According to Dr. George F. Keene, of Rhode Island, who is a very close observer, the annual tribute of the United States to this scourge is over 100,000 of its inhabitants. Each year the world yields up 1,095,000, each day 3,000, each minute 2 of its people as a sacrifice to this plague.

A Few Statistics.

Tuberculosis occurs most frequently in its pulmonary form, commonly known as consumption. According to the Imperial Sanitary Office of Berlin, thirteen per cent. of the deaths (during the years from 1888 to 1892) were due to pulmonary consumption. However, it must be stated that of late the mortality from tuberculosis has decreased in some European and American cities (Berlin, London, New York, Philadelphia, etc.), thanks to better preventive measures and more rational methods of treatment. In one

of the succeeding chapters we shall speak more in detail of public prophylaxis and special institutions for consumptives in the combat against tuberculosis. In relation to statistics we desire, lastly, to mention only some interesting facts gleaned from a pamphlet published last year by the Imperial Health Office of Berlin. According to this latest report the mortality from tuberculosis is greatest in Russia and Austria, being more than 3,500 per million inhabitants. It is lowest in England, being less than 1,500 per million. Germany occupies about the middle, while France comes immediately after Austria.*

Congresses for the Study and Combat of Tuberculosis.

The researches of recent years have demonstrated that consumption and also many other forms of tuberculosis may not only be prevented, but can in many cases be arrested and lastingly cured. The governments and the medical profession are aware of this, and have laboriously, energetically, and most unselfishly worked in the direction of solving this important problem, which means so much to the welfare of the people. The Congresses for the Study of Tuberculosis, which have met biennially since 1888 in Paris; the International Congress, which convened at Berlin in May, 1899, under the protection of her Majesty the Empress of Germany, and the Italian Congress, which was called together for the same purpose last year in Naples, give the best proof of the zeal of the medical profession and the governments to combat tuberculosis with all possible means.

But, as the motto of this essay expresses it, the intelligent cooperation of the people in this work is indispensable. To enable all men and women to participate intelligently in this combat against a common foe is the purpose of this essay.

We shall now give a brief description of the form of tuberculosis known as tuberculosis of the lungs, pulmonary tuberculosis, or consumption.

*The United States was not included in this table, but would probably come close to Germany.

CHAPTER I.

WHAT IS CONSUMPTION?

Pulmonary consumption, or tuberculosis of the lungs, is a chronic disease caused by the presence of the tubercle bacillus, or germ of consumption, in the lungs. The disease is locally characterized by countless tubercles, that is to say, small rounded bodies, visible to the naked eye. The bacilli can be found by the million in the affected organ. It is this little parasite, fungus, or mushroom, belonging to the lowest scale of vegetable life, which must be considered as the specific cause of all tuberculous diseases. This parasite not only gradually destroys the lung substance through ulcerative processes, but gives off at the same time certain poisonous substances called toxins which give rise to various, and often serious, symptoms.

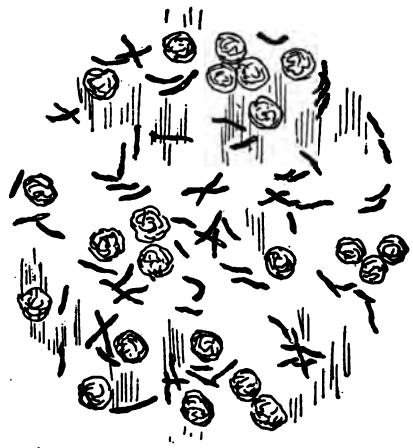

FIG. 1.—Tubercle Bacilli in Expectorated Matter. 1,200 times enlarged.

The important symptoms of pulmonary tuberculosis are cough, expectoration (spitting phlegm), fever (increased temperature of the body, especially in the evening hours), difficulty in breathing, pains in the chest, night-sweats, loss of appetite, hemorrhages (spitting of blood), and emaciation (loss of flesh).

In the matter expectorated, it is often possible to find the tubercle bacillus with the aid of the microscope and certain coloring matters. It appears in the form of small, slender rods. To give an idea of the minute size of these bacilli or bacteria, we reproduce here what is called a microscopic field twelve hundred times enlarged; in other words, just what one sees after having prepared a small portion of expectorated tuberculous matter under the microscope. The

rods represent the bacilli; the round or irregular bodies represent other substances which have been ejected along with the bacilli (Fig. 1).

CHAPTER II.

How may the Germ of Consumption (Bacillus Tuberculosis) Enter the Human System?

1. By being inhaled; that is, breathed into the lungs.
2. By being ingested; that is, eaten with tuberculous food.
3. By inoculation; that is, the penetration of tuberculous substance through a wound in the skin.

Of these three ways in which the bacilli may enter, the first one seems to be the most important.

CHAPTER III.

How does the Inhalation of the Bacilli Take Place?

Multitudes of Bacilli in the Expectoration.

A consumptive individual, even at a period when he is not confined to his bed, may expectorate enormous quantities of bacilli. Now if this expectoration, or spittle, is carelessly deposited here and there, so that it has an opportunity to dry and become pulverized, the least draught or motion in the air may cause it to mingle with the dust, and the individual breathing this dust-laden atmosphere is certainly exposed to the danger of becoming tuberculous, if his system offers a favorable soil for the growth of the *bacilli*. By "favorable soil for the growth of the bacilli" must be understood any condition in which the body is temporarily or permanently enfeebled. Such a condition may be inherited from parents, or acquired through alcoholism or drunkenness or other intemperate habits, through privation or disease.

Besides the danger arising from carelessly deposited sputum, or spittle, the inhalation or ingestion of the small particles of saliva which may be expelled by the consumptive during his so-called dry cough, or when speaking quickly or loudly, or when sneezing, must also be considered as dangerous for those who come in close

contact with the invalid. These almost invisible drops of saliva may contain tubercle bacilli. Recent experiments in this direction have shown the possibility of infection by this means.

CHAPTER IV.

What must be Done to Check the Spread of Consumption Caused by the Expectoration of Pulmonary Invalids?

A. *Destruction of Tuberculous Expectoration.*—Consumptives and those living with them must know that all precautionary measures are instituted in the interest of the invalid as well as of his fellowmen. These measures protect the patient from reinfection and others from the danger of contracting the disease.

A patient suffering from pulmonary consumption should know that, no matter in what stage of the disease he may be, his expectoration or spittle may spread the germ of the disease if the matter expectorated is not destroyed before it has a chance to dry and become pulverized. The patient should, therefore, always spit in some receptacle intended for the purpose. It is best to have this vessel made of metal so as not to break. It should be half filled with water or some disinfecting fluid, the main thing being to make it impossible for the expectoration to dry.

In factories, stores, railroad cars, waiting-rooms, court-rooms, restaurants, saloons, meeting-places, theatres, menageries—in short, wherever many people congregate—there should be a sufficient number of cuspidors well kept and regularly cleaned. They should be made of unbreakable material and have wide openings. If such measures are carried out, there will be no excuse for any one to expectorate on the floor and thus endanger the lives of his fellow-men.

Spittoons.

In the sick-room of a private home, at hospitals or sanatoria, only covered cuspidors should be used, and it is better to have them placed on stands, in niches, or in elevated boxes. We give an example of the last-named kind in Fig. 2, showing a blue enamelled iron spittoon in a box elevated on a stand. The spittoon is fastened by a clamp to the door of the box, and can be easily removed

for cleaning. The stand is most convenient when about three feet in height. Such an arrangement, besides making it more sure that the sputum will all reach the inside of the spittoon, has the additional pleasant feature of making the cuspidor visible only while it is being used by the patient. The cover of the receptacle prevents flies and other insects from coming in contact with the sputum. It has been proved that insects, especially flies, often carry the bacillus out of the sick-rooms of consumptives when sufficient care is not taken to cover the expectoration. The fly which has come in contact with tuberculous matter may spread the disease in three ways. First, it may carry small particles of spittle on its feet, and leave them wherever it may alight. Secondly, if it has partaken of tuberculous matter, it deposits its excrement at the next opportunity on some article of food, and thus the bacilli find their way into the digestive organs of man or beast. Thirdly, these insects may dry and crumble to dust which contains the bacilli, and the germs of the disease may thus enter the lungs.

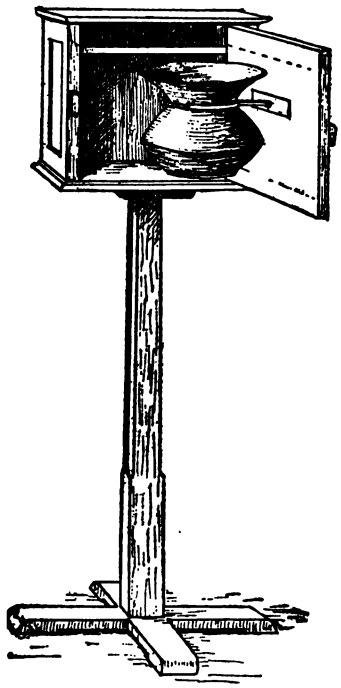

FIG. 2.—Elevated Spittoon.

The cuspidor of metal elevated and covered, presents further advantages over the usual uncovered vessel of porcelain or earthenware. Animals, such as dogs, cats, etc., will not be able to reach the contents of the cuspidor; and there is less danger of its bursting when placed outdoors at freezing temperature if enclosed in a box.

FIG. 3. — Predohl's Spittoon.

For factories, workshops, etc., Predohl's enamelled iron spittoon, nine inches high, eight inches in its largest and three inches in its smallest diameter, seems to answer all practical purposes. As the accompanying drawing (Fig. 3) indicates, it can be suspended at any height, and is very easily cleaned and disinfected.

FIG. 4.—Dettweiler's Pocket Flask.

FIG. 5 *a*.—Knopf's Nickel-plated Flask (Closed).

When outdoors, the patient should use a pocket flask to receive the spittle. There are numerous flasks in the market, and I reproduce a few of them: Dettweiler's, of blue glass and in three pieces (Fig. 4); Knopf's, of nickel-plated metal (Figs. 5 and 6); Liebe's, of blue glass in two pieces (Fig. 7). The directions for use usually accompany each flask. The more expensive ones (Figs. 4 and 5) can be manipulated with one hand. The cleaning of all of them is easy. The expectoration received in any receptacles, large spittoons or pocket flasks, should be so disposed of that the bacilli are killed. Where there is a good sewerage system the contents of these cuspidors may, without danger, be poured into the water-closet. Where there are no running water and perfect sewerage, it is better to boil the contents of the spittoons before pouring them into

Pocket Spittoons.

FIG. 5 *b*.—Funnel and Cover to Fig. 5 *a*.

FIG. 6.—Knopf's Aluminum Flask with Plain Cover.

the water-closet, or disposing of them otherwise. Thus, whenever possible, the tuberculous expectoration, that is to say, the entire contents of all classes of cuspidors, should be placed in a pot kept for that purpose which is partially filled with water. Every twenty-four hours or so this pot should be put on the fire and the contents brought to a boil. To raise the boiling point it might be well to add to each quart of water one or two teaspoonfuls of washing soda. After the mixture has boiled for about five minutes, it can be considered totally harmless, for all the bacilli will have been killed. The disinfection of tuberculous expectoration by carbolic acid (5 per cent.) or mercurial solutions (1:2,000) is not so certain, since these substances cause the albumen in the expectoration to coagulate, and thus form, in a measure, a protective cover for the bacilli and make their total destruction more difficult. Ordinary commercial wood vinegar is a better and more convenient disinfectant and need not be diluted when used.

FIG. 7.—Liebe's Pocket Spittoon.

Disinfection and Destruction of Tuberculous Matter.

When people are so situated as not to be able to dispose of the contents of the pocket spittoons by boiling or disinfection, we would recommend the following method: pour the contents of the flask on several layers of newspaper, gathering up the edges and being careful not to spill any, and throw the whole at once into the fire.

FIG. 8.—Spit-Cup of Aluminum or Porcelain.

A handkerchief should never be used as a receptacle for sputum. Patients who are too sick to make use of light porcelain or aluminum cups (Fig. 8), Seabury & Johnson's spitting-cup of pasteboard (Fig. 9), or the Kny-Scheerer pressed-paper cup (Fig. 10) should have a number of moist rags within easy reach. Care should be taken that the rags always remain moist, and that the used ones are burned before they have

a chance to dry. The paper spit-cups with their contents should, of course, also be destroyed by fire.

There will always be some consumptives who cannot be persuaded to use the pocket flask, for the simple reason that they do not wish to draw attention to their malady. The only thing for these people to do is to use squares of soft muslin, cheese-cloth, cheap handkerchiefs, or Japanese paper handkerchiefs specially manufactured for that purpose, which can be burned after use. They should also place in their pockets a removable lining of rubber or other impermeable substance which can be thoroughly cleaned. This additional pocket could be fastened to the inside of the ordinary pocket by clamps, and would thus be of no inconvenience to the patient. A pouch of vulcanized rubber or an Oriental tobacco-pouch may be used in place of the extra pocket of impermeable material.

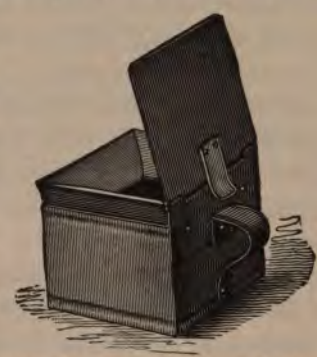

FIG. 9 *a*.—Frame of Seabury & Johnson's Spitting-Cup.

FIG. 9 *b*.—Folded Cardboard, to be Burned After Use.

FIG. 10.—Kny-Scheerer's Sanitary Spittoon Cup.

In any case it is well to have more than one of these pockets or pouches, so that the patient is never without one while they are being cleaned and immersed in some disinfectant solution or boiling water. Of course, all invalids using handkerchiefs, rags, or Japanese paper as receptacles for expectoration, are in danger of

infecting their hands, and should always wash them thoroughly before touching food.

B. *Disinfection of the Sick-Room.*—The rooms occupied by a tuberculous patient should be thoroughly disinfected at regular intervals, since it is possible that even with great care the furniture, floors, walls, etc., may have been infected. Even the occasional disinfection of the personal effects of the patient is advisable. In case of decease it is, of course, self-understood that everything the consumptive might have come in contact with, particularly furniture, bedding, clothing, books,* etc., should be thoroughly disinfected. In many communities such disinfection is now attended to by the board of health. Where the aid of the health board cannot be secured, the following directions will enable one to make a thorough disinfection by formaldehyde gas: 1. All cracks or openings in the plaster, in the floor, or about the doors and windows should be caulked tight with cotton or strips of cloth. 2. The linen, quilts, blankets, carpets, etc., should be stretched out on a line in order to expose as much surface as possible to the disinfectant. They should not be thrown into a heap. Books should be suspended by their covers, so that the pages will fall open and be freely exposed. 3. The walls and the floor of the room and the articles contained in it should be thoroughly sprayed with water. If masses of matter or sputum are dried on the floor, they should be soaked with water and loosened. No vessel of water should, however, be allowed to remain in the room. 4. One hundred and fifty cubic centimeters (five ounces) of the commercial forty-per-cent. solution of formalin for each one thousand cubic feet of space should be placed in the distilling apparatus and be distilled as rapidly as possible. The keyhole and spaces about the door should then be packed with cotton or cloth. 5. The room thus treated should remain closed at least ten hours. If there is much leakage of gas into the surrounding rooms, a second or third distillation of formaldehyde should be made at intervals of two or three hours.

malde-
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ms, etc.

*The possibility of transmitting tuberculosis through books has been demonstrated, particularly if the patient has been in the habit of moistening his fingers with saliva while turning the leaves.

To be sure that the work is well done, it is always best to have it supervised by a physician. To managers of hotels and boarding-houses in health resorts, this method of disinfection is particularly to be recommended, and the disinfection of rooms occupied by consumptive guests should always take place immediately after their removal.

Permanently Infected Houses.

In some cities and villages tuberculosis seems to cling to certain localities and houses. The disease appears in a veritable endemic form, that is to say, it is always present there, either from the fact that careless tuberculous patients have lived for years in these houses, or owing to the equally important fact that the soil on which they are built, or the manner in which they have been constructed, is such as to favor the retention of the tuberculous infection indefinitely. When a thorough sanitary overhauling does not suffice to stamp out these sources of infection, the destruction of such dwellings seems the only remedy.

CHAPTER V.

What can be Done to Protect Ourselves from the Small Particles of Saliva Containing Bacilli, Thrown Out by the Consumptive during Dry Cough, Loud Speaking, or Sneezing?

There is real danger from this source of infection only when one remains a considerable length of time very near the tuberculous patient while he coughs or speaks. At a distance of three or four feet the danger practically ceases. The relatively few bacilli which are expelled with the saliva during the dry cough, sneezing, or loud speaking, are probably never thrown farther than three feet, and fall rapidly to the ground.

But even the lesser danger which may arise from the bacilli having fallen to the floor with the particles of saliva must be prevented. They must not be allowed to accumulate and so be blown up with the dust into the air. Therefore the floor of the room of a tuberculous patient should never have any fixed carpet; and even the wooden floor should never be swept with a broom, but should be frequently wiped up with a wet cloth or with crude oil. Dusty fur-

Arrangement of the Consumptive's Room.

niture should be cleaned in the same way. Plush, velvet, or cloth-covered furniture, heavy curtains or other fancy decorations, which might serve as dust-catchers, should not be allowed in the room of a tuberculous patient. Leather-covered, rattan, and plain wooden furniture are certainly the best, and the curtains should always be of washable material. Fancy curtains of cloth, velour, or silk, which accumulate dust and keep the air and sun out of the rooms, should be discarded.

If at all possible, every patient should have his own room, but he should always have his own bed. For a well person to sleep in a bed very close to a tuberculous patient is almost as dangerous as to sleep together in one bed.

Precautions to be taken by Nurses.

Friends, relatives, and nurses should not remain very near the patient longer than necessary, and the tuberculous invalid should be urged always to hold a handkerchief before his mouth and nose while coughing or sneezing. He should, furthermore, be advised to carry two handkerchiefs with him always: one to hold before his mouth and to wipe it with after having expectorated; the other to use only to wipe his nose. By being careful with the use of his handkerchiefs, the danger of infecting his nose and bronchial tubes will be materially lessened.

Precautions with the Washing.

All soiled linen (sheets, pillow-cases, underwear, napkins, handkerchiefs, etc.) used by the consumptive, should not be handled more than necessary, but should be placed in water as soon as possible after removal from bed or body. It is better to wash these articles separately, and only after having been thoroughly boiled should they be put with the common laundry. Wherever it is not possible to carry out these precautionary measures in their entirety, one should strive to follow them as far as it is in one's power.

CHAPTER VI.

How may Man Give Tuberculosis to Animals?

In one of the preceding chapters we have spoken of the importance of elevated spittoons to protect domestic animals, such as cats, dogs, etc., from the danger of becoming tuberculous by licking up tuberculous expectoration. By the careless expectorating

of consumptives in meadows, fields, or stables, animals may become infected with the disease. The following very instructive fact came to the notice of the author of this essay: In an institution for the treatment of consumptives, managed by Sisters of Charity, and where, I am sorry to say, there was not enough strict medical supervision, there existed only certain rules concerning the care of the expectoration within doors; outside of the institution the patients were at liberty to do as they liked, and they expectorated wherever they pleased in their daily walks in the near-by meadows. A neighboring farmer who, some time before, had bought five healthy cows, had them retested, with the result that two were found to be tuberculous. He had the tuberculous cows killed, the stable cleaned and disinfected, and no longer allowed the patients of the neighboring sanatorium to promenade in the meadows where his cows pastured, and no more tuberculosis appeared among his cattle.

Now, although it is true that the sun and the air ultimately destroy the germs of the tuberculous sputum, it is not wise to rely upon this. Tuberculous substances may do harm by being licked up by animals before the sun and air have had time to kill the bacilli, and in dark and damp places it often takes a long time before atmospheric influence renders the tuberculous matter absolutely inoffensive.

Danger Superfici Burial o Tubercu lous Substanc

The stools of patients suffering from tuberculosis of the intestines should be disinfected by a five-per-cent. solution of carbolic acid. The superficial burying of tuberculous meat or tuberculous expectorations without previous thorough disinfection must be considered as dangerous.

CHAPTER VII.

How can We Guard Against Germs of Tuberculosis in Our Food?

Whenever one is not reasonably certain that the meat he eats has been carefully inspected and declared free from disease germs, it should be very thoroughly cooked. By this means one is certain to kill all the dangerous micro-organisms. Against the sale

of tuberculous milk there are very excellent laws in some States of the Union, which are rigorously enforced. In some the laws are less good, and in some there are no laws at the present time.

In justice to farmers and dairymen it must, however, be said that there are many who do their very best to protect themselves and their fellow-men from the danger of tuberculosis. They have their cows tested regularly, destroy the animals which are found to be tuberculous, and keep their stables and utensils for milk as clean as possible.

Boiling or Sterilizing Milk.

Unless one can be reasonably sure that the cows from which the milk is derived are healthy and not tuberculous, the milk should be boiled or sterilized before use, more especially when it is intended as food for children. Milk obtained from stores and from milk peddlers should invariably be submitted to boiling or sterilization. When milk is kept slowly boiling for five minutes, all the bacilli are killed, and the same result is obtained by the sterilizing process, that is to say, to keep the milk heated for at least half an hour at a temperature of about 70° C. or 160° F. There are now in the market a number of cheap and practical apparatuses for sterilizing milk, which can be obtained at almost any drug store.

CHAPTER VIII.

In What Other Ways may the Bacilli or Germs of Consumption Enter the Intestinal Tract?

Infection by Saliva.

Since the tubercle bacillus may be found in the saliva of a tuberculous patient, it is best never to kiss such a person on the mouth. The habit of caressing or kissing domestic animals (parrots, canary-birds, dogs, cats), many of whom are tuberculous, is equally dangerous, for through such habits these animals can certainly transmit tuberculosis to man.

Tuberculous patients should have their own drinking glasses, spoons, forks, etc.; or, at least, all table utensils which have served the tuberculous patient should be boiled after use.

The patient should never, out of false modesty, swallow his expectoration. He will thus avoid the danger of contracting intestinal tuberculosis. How important this warning is may become

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evident from observations of the tuberculous insane. These unfortunate people, with whom hygienic education is impossible, often swallow their expectoration, and as a consequence intestinal tuberculosis or consumption of the bowels is very frequent among them. Every consumptive patient should remember never to touch food before having washed his hands very thoroughly. Even with the greatest care, it is possible that he may have soiled his hands with tuberculous expectoration.

Danger of Swallowing Tuberculous Sputum.

CHAPTER IX.

How may Tuberculosis be Contracted through Inoculation (Penetration of Tuberculous Substances through the Skin)?

Inoculation of tuberculosis happens perhaps most frequently through injuries received while cleaning nicked or chipped glass or porcelain cuspidors which had been used by consumptives. It is also possible for the bacilli to enter the circulation if the person cleaning the spittoons happens to have a wound or open sore on his hand. Persons entrusted with the care of the spittoons in a private home or an institution for consumptives should wear rubber gloves while cleaning these vessels.

Care to be Taken in Cleaning Spittoons.

At times the patient may inoculate himself by placing an accidentally injured finger in his mouth, or by carelessly soiling an open wound with his expectoration.

Physicians, students of medicine or veterinary science, butchers, etc., are also exposed to the danger of wounding themselves with instruments which may have come in contact with tuberculous matter. Extreme care is the only remedy for all persons thus exposed.

If one has been unfortunate enough to receive an injury and tuberculous inoculation is feared, the best thing to do is to let the wound bleed freely, wash it thoroughly with water that has been boiled, with a five-per-cent. solution of carbolic acid, or with pure alcohol; dress the wound with a clean rag dipped in any of these liquids, and seek as soon as possible the advice of the physician.

By tattooing tuberculosis has been transmitted in various in-

stances, because the operator was a consumptive. Men who follow the profession of tattooing have, as a rule, the habit of dissolving the colors, necessary for their work, with their own saliva, hence the infection. The best thing, therefore, is never to permit such barbaric decorations on one's body.

Ritual Circumcision.

Of less frequent causes of propagating tuberculosis, but which, in the light of modern sanitary science, can and should be prevented, we will cite the ritual act of circumcision, practised according to Jewish rites, when the operator happens to be consumptive. It is also well known that, through lack of skill in after-treatment, secondary hemorrhage and wound infection have ensued. Too many a young life has thus been needlessly sacrificed. The operation of circumcision, when skilfully and rapidly performed, is in itself trifling, but the sucking of the prepuce afterward makes it dangerous. Since it will be difficult to stop this practice by a simple protest on the part of physicians, and as the law cannot interfere with the free exercise of a religious rite, I should suggest as a remedy that only such persons should be allowed to perform circumcision as have shown the necessary skill before a medical board of examiners, and that every time they are called upon to perform the rite, they should submit themselves to a medical examination. Only when bearing a certificate from a regular physician, stating the absolute freedom from specific diseases, should they be allowed to perform ritual circumcision.

As another reliable measure against the possibility of inoculating the child, when the parents insist upon the orthodox method of circumcision, is the suction by the aid of a glass tube, as practised in France and Germany.

CHAPTER X.

What Other Forms of Tuberculosis Exist, and What are Their Principal Symptoms?

In the foregoing chapters we have treated of the bacillus of tuberculosis, its mode of entrance into the system, and of the symptoms of the most frequent form of the disease—that is to say, consumption or pulmonary tuberculosis. Now we will consider some of its other forms or manifestations.

Tuberculosis of the Throat.

More closely related to consumption than any other form of tuberculosis is laryngeal tuberculosis, also called tuberculosis of the larynx, or tuberculosis of the throat. This disease is not nearly so frequent as pulmonary tuberculosis, but sometimes occurs with it. Besides all the symptoms which tuberculosis of the throat has in common with tuberculosis of the lungs, such as fever, nightsweats, emaciation or loss of flesh, difficulty in breathing, cough, etc., there are in this disease additional symptoms, such as more or less pronounced hoarseness and frequent and intense pain during the act of swallowing, which makes eating bread, meat, and other solid food exceedingly difficult. The internal appearance of the throat shows little tuberculous growths and ulcers in the region of the vocal cords and neighboring tissue.

Tuberculosis of the Bones.

Tuberculosis of the bones, which not infrequently leads to a total necrosis—that is, a softening and final decay of the bones—is not a rare disease. If the seat of the disease is the spinal column, the decay of one or more vertebræ may result in the deformity commonly known as hunchback. If through this breaking down there should result a compression of the spinal marrow, paralysis of arms or legs, and other disturbances, such as difficulty in retaining the urine and the stools, may be observed.

While tuberculosis of the bones and joints is almost painless at the beginning, it may gradually lead to loss of the use of the joints, to maturation and destruction, which may become extensive enough to make even amputation necessary.

Tuberculous Meningitis.

In younger children tuberculous spinal meningitis is not rare, and, alas! very often proves fatal. The essential symptoms of this disease are digestive disturbances (vomiting or constipation), uneasiness and depression, later on paralysis of the extremities, delirium, and sometimes coma (profound insensibility).

Consumption of the Bowels.

More frequent and almost as dangerous as tuberculous meningitis in children, is tuberculosis of the intestines and the peritoneum (the lining of the abdominal cavity). This affection is sometimes also called consumption of the bowels. The most pronounced symptom in such cases is very often a protracted diarrhœa, which cannot be easily controlled by dieting or medication.

Hasty Consumption.

At times the whole body is invaded by the tuberculous disease, and countless little tubercles are distributed in all the organs. This disease is then called "miliary tuberculosis" because the tubercles are like millet seeds. The origin of this disease is probably always due to the sudden outbreak of a localized tuberculous lesion, which had been at a standstill before. The first symptoms of miliary tuberculosis resemble those of typhoid fever. They are generally depression, lassitude, and fever. This is also one of the forms of tuberculosis which often prove fatal.

Lupus.

Of the so-called localized tuberculous diseases, we must mention the form which manifests itself as a skin disease and is known as lupus, showing itself as ulcerous patches mainly on the face.

Scrofula.

So-called scrofulosis, or scrofula, is now considered also as a form of tuberculosis. It appears almost exclusively during childhood. It is a milder disease than the other forms of tuberculosis, and manifests itself mainly in swelling of the glands, eruption of the skin, and inflammation of eyes and ears.

CHAPTER XI.

What Protects the Healthy Individual from Contracting Tuberculosis?

After all that we have said of the contagiousness, or rather the communicability, of tuberculosis, and consumption in particular, one must not think that a breath in an atmosphere accidentally laden with bacilli would certainly render a healthy individual consumptive, or that by a swallow of tuberculous milk or a little injury from a broken cuspidor one must necessarily become tuberculous. The secretions of our nasal cavities, doubtlessly also the blood, and the secretions of the stomach of a healthy individual, have bactericidal properties; that is to say, they kill the dangerous germs before they have a chance to do harm. Therefore, the healthy man and woman should not have an exaggerated fear of tuberculosis, but they should, nevertheless, not recklessly expose themselves to the danger of infection.

CHAPTER XII.

How may One Successfully Overcome a Hereditary Disposition to Consumption?

The mother who fears for her future child a hereditary disposition to tuberculosis should lead a very healthful life. She should be as much in the open air as possible, breathe deeply and eat regularly of plain but nourishing food. Never should she wear garments which constrict any of her chest or abdominal organs. She should replace the corset by a comfortable waist which permits free and deep respiratory movements. Instead of tying her skirts around her waist, she should have them suspended from the shoulders, which can easily be done by attaching buttons to the waist. By wearing a close-fitting union suit for underwear, of wool or cotton according to the season, it will be possible to get along with less skirts, and thus lessen the weight around the waist. The whole dress of the mother should be so arranged that there are no constricting bands, and that no organ in the body should be hindered in its free physiological functions. How important a more healthful and natural dress really is for the welfare and development of mankind in general, a mother seldom realizes either for herself or for her daughters. They are all only too often the slaves of fashion. The tightly laced corset should be banished forever from the dress of women. Not only is free and natural breathing interfered with by this article of dress, but indigestion and disturbances in the circulation follow excessively tight lacing. Anæmia, or poverty of the blood, so often observed in young girls, can very frequently be ascribed to this unnatural mode of dress, which does not permit either a free circulation or sufficient oxygenation of the blood.

Hygiene and Dress for Tuberculous Mothers.

We reproduce here three pictures better to illustrate the result of excessive lacing. Fig. 11 shows the situation of the organs in chest and abdomen in a normal thorax. Fig. 12 shows lungs, heart, and intestines as they appear in a thorax constricted by wearing a tightly laced corset for a number of years. Fig. 13 shows the skeleton of a chest deformed by tight lacing.

Tight Lacing.

Belts. The wearing by men of belts instead of suspenders is not to be recommended. In order to keep the trousers in place the belt must be considerably tightened, the result is constriction of the abdomen, hindering the natural action of the intestines which is essential to good digestion. Hernias (ruptures) may also be the result of this mode of dress. It cannot be insisted upon too often that in an individual predisposed to tuberculosis nothing can be more injurious than an interference with proper digestion and assimilation. To keep stomach and bowels in good order is one of the best safeguards against taking the disease.

Neckwear, for men as well as for women, should be loose. Tight and constricting collars or bands around the neck may cause

FIG. 11.

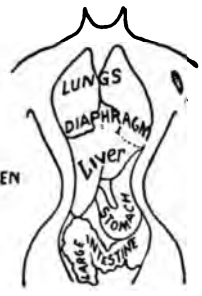

FIG. 12.

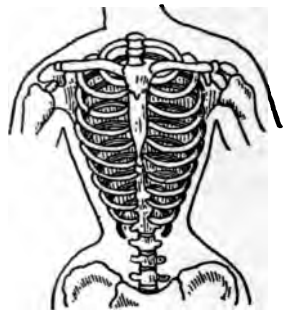

FIG. 13.

an insufficient air-supply, congestion of the arteries of the brain, and subsequently headache and dizziness. To dress the neck too warmly lessens the power to resist taking cold when there happens to be a change in the atmosphere. The less one is accustomed to bundling up the neck, the less liable will he be to take cold.

Neckwear.

Ladies cannot be told too often to abandon the unhygienic fashion of trailing dresses, at least in the street. They should be brave and show the world that they care for the health and welfare of others. When one considers how many millions of dangerous bacilli and micro-organisms are gathered up with the dust and brought into the house by this unhealthy mode of dress, further argument is hardly necessary to prove that the wearing of trains is absolutely dangerous to health. As the poet of the London *Truth*

Trailing Skirts.

puts it in his "Song of the Skirt," why should dresses be made to do "the scavenger's dirty work":

"Sweep—sweep—sweep—
Where the waste of the street lies thick,
Sweep—sweep—sweep—
However our path we pick;
Dust, bacillus, and germ,
Germ, bacillus, and dust,
Till we shudder and turn from the sorry sight
With a gesture of disgust.

"Oh, men with sisters dear!
Oh, men who have well-dressed wives,
It is not alone an expensive mode,
It is one that hazards lives!
For malignant microbes swarm
In the triturated dirt,
And the dress that sweeps it up may prove
A shroud as well as a skirt!"

Footwear.

Footwear is also a matter of importance. Shoes should never be worn too tight. They not only hinder free movements, but the constriction of the blood-vessels causes impaired circulation and coldness of the extremities.

If it is found necessary to wear underwear at night, a different set should be kept for that purpose, which, with the night-dress or night-shirt, should be well aired during the day-time.

Hygiene and Care of the Child of a Tuberculous Mother.

Whenever a mother has a tendency to tuberculous disease, the child should be given a healthy wet-nurse, or be fed artificially with modified cow's milk. The advice of the physician is indispensable under such circumstances. The child should have its own bed, and should never, never sleep in the same bed with the mother. The bedroom should always be well ventilated, and the child should be taken into the open air as soon as practicable. The old-fashioned habit of enveloping the child's head in a thick veil should be abandoned. It is a good plan to let the little one run about naked or with only a little shirt on, for a while every day in a warm, sunny room. A bare wooden floor or a square of closely woven matting, that can be kept scrupulously clean, is much to be preferred to dust-collecting carpets.

Sun and Air Baths for Little Children.

From the tenth to the twelfth month one should accustom the

child gradually to cold baths. The best way to begin is after its daily warm bath to rub the child a few times with the hands dipped in cold water, and then wipe it rapidly. By and by one may begin with cold sponging, and later on with a little douche. In the use of cold water it is absolutely necessary that the reaction should rapidly follow. This reaction is manifested by a pleasant warmth perceived by the child, and externally is made visible by a reddish appearance of the skin. Whenever cold water is applied to the skin one will notice at first a certain whiteness or pallor, which is caused by a contraction of the external blood-vessels. The return of the blood to the external surface causes the reddening of the skin. Whenever reaction is lacking or tardy, the advice of the physician should be sought.

Use of Cold Water.

Though the application of cold water is beneficial, one should never forget that there are people whose constitutions differ, and that a routine treatment is not applicable to every individual. The careful, judicious, and regular application of cold water is perhaps one of the best preventive measures against taking cold, for children as well as adults, and its use generally should be more recommended. Persons not accustomed to the use of cold water can easily become so by being rubbed every day with alcohol for a week or so. During the second week they should be rubbed with half alcohol and half water, and the third week with water alone. By this means one gradually educates one's self to the use of cold sponge baths, ablutions, and douches.

Every family does not have the luxury of a douche apparatus, and sometimes not even a bathroom. For such I wish to describe a simple method which will answer the purpose. Take a large circular English bath-tub, about three feet in diameter and ten inches high, and pour about five inches of cold or tepid water into it. The bather jumps into the water, keeping his feet in motion for a few seconds, and pours one or two pitcherfuls of water quickly over each shoulder, thoroughly wetting the whole body. It is not at all essential that the head should be wet at the same time. The douche can be made easier by the help of a second person to pour the water from the pitcher or watering-pot. If a hose can be attached to a nearby faucet, a douche, needle bath, or direct jet

Improvised Douche.

can be improvised. The temperature of the water may vary from 60° to 40° F. The room in which the bath is taken should be warmed in cold weather. The best and, perhaps, also most convenient time to take a cold bath is in the morning before dressing, or in the evening before retiring. Whenever reaction is feeble, that is to say, when a pleasant feeling of warmth after the bath does not come quickly enough, one should proceed as follows: If the bath is to be taken in the morning rise half an hour earlier, cover the bed so that the warmth is retained; then, after the application of cold water has been taken rapidly in the manner above described, rub with a rough Turkish towel and return as quickly as possible to the warm bed. If it is not practicable to take the bath in the morning, one can obtain the same result by going to bed half an hour earlier, and when the bed is warm rise again to take the cold-water application. In most cases the return to the warm bed will assure a thorough reaction; but if these precautions, in addition to vigorous friction after the bath, do not suffice to produce a proper reaction, it is a sign that the body has not enough resistance for this kind of treatment, and the physician should be consulted.

How to Help Reaction.

Cold baths, especially bathing in a river or in the ocean, are, of course, to be recommended in warm weather. Weakly and elderly persons should not take cold baths, no matter at what season, unless permitted to do so by their physician.

To keep the skin clean and in good condition, cold baths, even when taken every day, are not always sufficient, and soap and warm water should be used at least once a week. The warm bath should always be followed by a rapid sponging off with cold water.

Warm Baths.

As soon as the intelligence of the growing child will permit, it should be taught to breathe deeply, and later on be taught to take the following breathing exercises, which the child should learn to love as the average boy or girl loves general gymnastics. In front of the open window or out of doors assume the position of the military "attention," heels together, body erect, and hands on the sides. With the mouth closed take a deep inspiration (that is, breathe in all the air possible), and while doing so raise the arms to a horizontal position; remain thus holding the air inhaled for

Respiratory Exercises with Movement of Arms.

about three seconds, and while exhaling (breathing out) bring the arms down to the original position. This act of exhalation, or expiration, should be a little more rapid than the act of inspiration. When the first exercise is thoroughly mastered and has been practised for several days, one may begin with the second exercise, which is like the first, except that the upward movement of the arms is continued until the hands meet over the head.

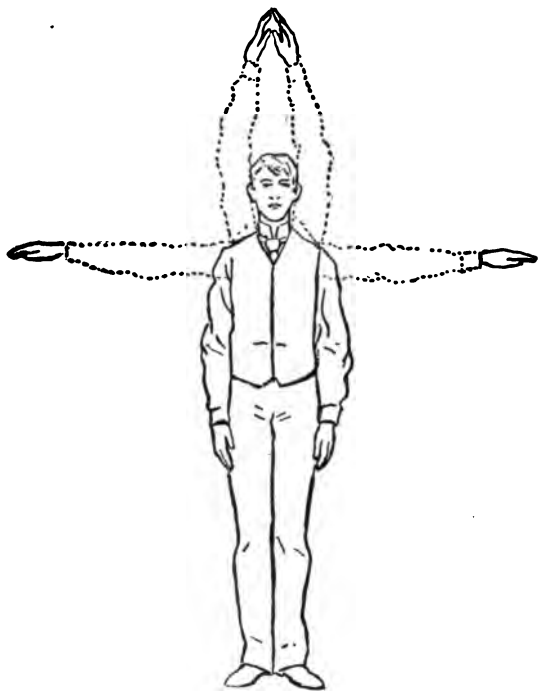

FIG. 14.—First and Second Breathing Exercises.

The accompanying illustration (Fig. 14) shows the positions which are to be taken during those two exercises. The third breathing or respiratory exercise, which requires more strength and endurance, should not be undertaken until the first two have been practised regularly several times a day for a few weeks, and until an evident improvement in breathing and general well-being has been observed. We will endeavor to make this third exercise, which might be called a dry swim, more comprehensible by the illustration (Fig. 15). Take the same military position of "attention," and then stretch the arms out as in the act of swimming, the backs of the hands touching each other. During the inspiration move the arms outward until they finally meet behind the back. Remain in this position a few seconds, retain the air, and during exhalation bring the arms forward again. This somewhat

difficult exercise can be facilitated and be made more effective by rising on the toes during the act of inhalation, and descending during the act of expiration.

Respiratory Exercises without Movement of Arms.

Of course, when out of doors one cannot always take these exercises with the movement of the arms without attracting attention; under such conditions raise the shoulders, making a rotary backward movement during the act of inhaling; remain in this position, holding the breath for a few seconds, and then exhale while moving the shoulders forward and downward, assuming again the normal position. This exercise (Fig. 16) can be easily taken while walking, sitting, or riding in the open air.

Young girls and boys, and especially those who are predisposed to consumption, often acquire a habit of stooping. To overcome this the following exercise (Fig. 17) is to be recommended. The child makes his best effort to stand straight, places his hands on his hips with the thumbs in front, and then bends slowly backward as far as he can during the act of inhaling. He remains in this position for a few seconds, while holding the breath, and then rises again somewhat more rapidly, during the act of exhalation.

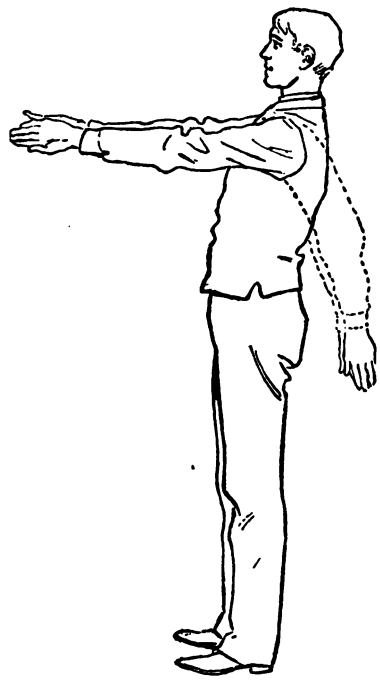

FIG. 15.—Third Breathing Exercise.

General Rules Concerning Respiratory Exercises.

The following general rule concerning breathing exercises should always be remembered. Commence with the easier exercises (Figs. 14 and 16), and do not begin with the more difficult ones (Figs. 15 and 17) until the former are completely mastered. Take from three to six respiratory exercises, either of one kind or the other, every half hour, and continue this practice until deep breathing has become a natural habit. These exercises should always be taken in

an atmosphere as fresh and as free from dust as possible. Never take these exercises when tired, and never continue so long as to become tired.

Mouth-breathing in children, and sometimes in adults, is often caused by certain growths in the throat (adenoid vegetation), by enlarged tonsils, or by growths in the nose (polypi, etc.) The removal of these obstructions by surgical aid is perhaps the only rational method to assure natural breathing. Incidentally, we may be permitted to say that these operations are not at all dangerous; but by the presence of these vegetations in the throat (retro-pharynx) the hearing and the intellectual and bodily development of the child may become seriously impaired. The early removal of such growths should be earnestly recommended. The respiratory exercises just described are particularly useful for such children after operation, otherwise they might retain the habit of imperfect breathing which they had acquired.

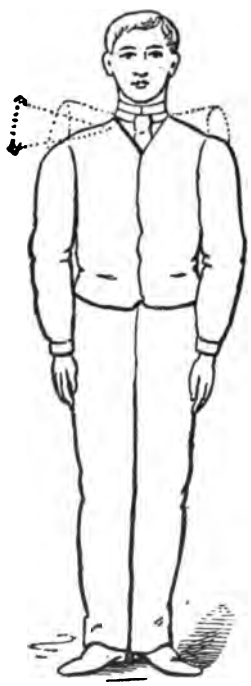

FIG. 16. — Breathing Exercise with Rolling of Shoulders.

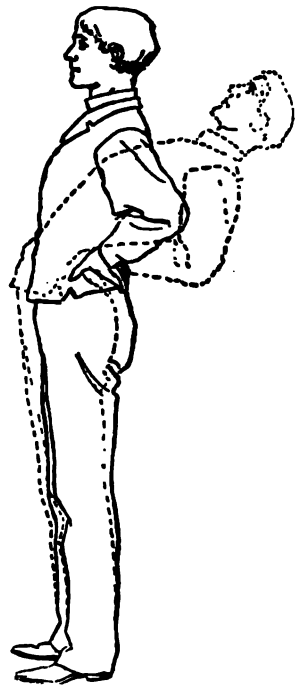

FIG. 17.—Exercise for People in the Habit of Stooping.

Causes of Mouth-Breathing.

Among exercises which have a tendency to develop and strengthen lungs and throat, we will also mention singing and reciting in the open air.

Not only during the day, but also at night, there should be a

desire for fresh air. The still very prevalent idea that night air is injurious is wrong. The night air is purer than that of the day, particularly in great cities, therefore one should always keep at least one window open in the bedroom or in an adjoining room, and thus assure a sufficient and permanent ventilation. Of course, it is always wise to protect one's self against direct draughts from the open window. When it is not possible to place the bed so that it will be out of the draught, a screen in front of the open window will suffice for protection.

Relative Purity of Night Air.

It is, of course, self-understood that all individuals who have an inherited disposition to tuberculosis should always endeavor to live as much as possible in good, fresh, pure air. To visit dancing-halls, saloons, and smoking-rooms can only be deleterious to such people. Smoking should be absolutely prohibited for young men with weak chests, and for all people having a tendency to tuberculosis. The smoking of cigarettes is particularly dangerous, since the habit once acquired tends to undermine even a strong constitution.

Crowded Rooms and Smoking.

FIG. 18.—Humidifier.

Many of our American dwellings in winter are heated altogether too much. A temperature of from 65° F. to 68° F. should be sufficient, especially when care is taken that the heat produced by the furnace is not too dry. The excessively dry atmosphere in winter of many city and country homes often gives rise to nasal catarrh, a condition which everybody, but especially those suffering from pulmonary diseases, or prone to them, should be anxious to avoid. Besides keeping the water pan in the furnace constantly filled, there should be in the sitting-room and sleeping-rooms some humidifying arrangement such as is pictured here (Fig. 18). More simple evaporating devices, however, as a vessel

Excessive Dryness and Heat in Dwellings.

filled with water and a cloth suspended above it touching the water so as to produce capillary attraction, will answer the purpose of rendering the atmosphere sufficiently humid.

Raising and Educating Predisposed Children.

The proper bringing up of children that have a tendency to become tuberculous is of the greatest importance. Many are poor eaters from the day of their birth. Discipline, not to allow too many sweets, to observe regular meal-times and to keep the bowels in good condition, are the best means to combat a dislike for eating. As early as possible children should be taught to clean their teeth thoroughly after each meal, for a good digestion is dependent upon the condition of the teeth. The dislike to play outdoors, which is so characteristic of the little candidates for tuberculous diseases, can also only be overcome by discipline. To dress them too warmly and bundle them up all the time is as injurious as having them remain most of the time indoors. Such children should not work too hard during their school age. To spend too many hours sitting down, to do too much brain work, to spend too much time at the piano or in other musical studies, have a tendency often to weaken seriously the child predisposed to tuberculosis.

Gymnastic exercises should be recommended to young people of both sexes, and young girls especially should continue their healthful outdoor sports after they have left school. Of course, excesses are injurious in everything, and we wish to say here that, no matter how healthful a sport may be, if carried on too violently or for too long, it must ultimately prove injurious. To be cheerful, to live a regular life, to eat plain but good food, to avoid all alcoholic beverages, to see that the bowels move freely every day, to keep the whole body clean, and to sleep at least eight hours out of twenty-four, is the best way to remain well.

Once more we desire to call attention to the clothing of growing girls and boys. The thickness of the garments should be according to the season, and they should always be made so that every movement of the body may be free, and none of its functions, such as respiration, digestion, etc., in any way interfered with.

Choice of Occupation.

When the time comes to choose a profession or trade for a young man who has a tendency to tuberculosis, one should bear in mind that gardening, farming, forestry, and all occupations which de-

mand an outdoor life, are the most likely to make him a strong man and a useful member of society.

In connection with the precautions which should be taken to combat a tendency to tuberculosis, we must say a few words concerning the curability of consumption or pulmonary tuberculosis. The old idea—still, alas! very prevalent and deeply rooted in the minds of many people—that a tuberculous individual who has seemingly inherited his tendency to the disease, can have no hope of cure, is wrong. We desire to emphasize the fact that the chances for a cure of the consumptive individual does not at all depend upon whether he had a hereditary tendency, or has accidentally acquired the disease. There are hundreds of cases of healed tuberculosis in men and women who have lived to old age, and nevertheless their fathers or mothers had succumbed to consumption.

Hereditary Consumption as Curable a Acquired Consumption.

The assumption that tuberculosis is often directly transmitted from parent to child is equally erroneous. Of course, there are in medical literature a few cases which show that such direct transmission is possible, but they are exceedingly rare. When little children have become tuberculous the infection can almost always be traced to the child having slept or been much in contact with a consumptive mother or other consumptive individuals, having been kissed on the mouth, or having played on the dirty, infected floor, etc. All this shows the importance of absolute cleanliness and the strictest hygiene from early infancy.

Hereditary Transmission.

CHAPTER XIII.

How can a Predisposition to Tuberculosis, Other than Hereditary, be Created or Acquired?

1. By the intemperate use of alcoholic beverages, a dissipated life, excesses of all kinds, etc.

2. By certain diseases which weaken the constitution; for example, pneumonia, typhoid fever, smallpox, measles, whooping cough, syphilis, influenza, etc.

3. By certain occupations, trades, and professions, such as printing, hat-making, tailoring, weaving, and all occupations where the worker is much exposed to the inhalation of various kinds of dust,

as bakers, millers, confectioners, cigar-makers, chimney-sweepers, and the workers in lead, wood, stone, metals, etc.

CHAPTER XIV.

How may an Acquired Predisposition be Overcome, and Seemingly Unhealthy Occupations Made Relatively Harmless?

Tuberculosis and Venereal Diseases.

All persons who have been weakened through intemperance or excesses, who are convalescent from serious diseases, or who are suffering from the effects of harmful occupations, should not associate with consumptives. For the intemperate man, the fast liver, or one inclined to excesses, there is no remedy except to change his mode of life. The unfortunate who by his own fault or the carelessness of others has fallen a victim to a venereal disease (syphilis, etc.) we would urgently recommend to submit himself to thorough treatment by a competent physician. For the comfort of these unfortunate sufferers, we desire to say that all venereal diseases can be successfully treated when the patient seeks timely medical advice and obeys the physician's instructions faithfully. Since venereal diseases are highly contagious, the physician's instructions will also protect others from becoming infected, and the patient himself from reinfection. The necessity of seeking medical advice holds good for all those who by intemperance or excesses of any kind have undermined their constitution, and thus diminished their natural resistance to the invasion of the tubercle bacilli.

Hygiene in Factories, Workshops, etc.

In many States of the Union there now exist laws whereby the sanitary conditions of factories, workshops, department-stores, etc., are assured. Of course, there is room for much improvement in this respect, especially in regard to light and sufficient ventilation in factories where dust and gases are a constant menace to the laborer. Whenever practicable, respiratory masks for protection against particularly irritating dust, should be worn. People much exposed to the inhalation of flour dust should clean their teeth thoroughly (the inside as well as the outside). By removing the flour dust from the spaces between the teeth, the formation of glucose (sugar) through the action of the saliva on the flour is

avoided, and thus the germs of fermentation are deprived of a favorable soil for development.

In all these matters the laborer can help himself a good deal by his own efforts to make a seemingly dangerous occupation more safe. During the hours of recess, and before he goes to work as well as afterward, he should always strive to be as much as possible in the open air, drink plenty of pure, clean water, keep early hours, live as regular a life as possible, avoid the saloon, and never take alcoholic beverages.

Self-Help of the Laborer.

All the other hygienic precautions and means of improving the general health of which we have spoken in Chapter XII., "How may one successfully overcome a hereditary disposition to tuberculosis?" such as breathing exercises, the use of cold water, etc., are, of course, just as essential to combat a disposition to tuberculosis which has been acquired.

CHAPTER XV.

What can Well-Meaning and Conscientious Employers in City and Country Do to Help Combat Tuberculosis?

All who employ a number of people and provide their lodgings should bear in mind that unhealthy, dark, damp, and badly ventilated rooms are powerful factors in the propagation of tuberculosis. The soil upon which a dwelling for human beings is to be built, should be dry, free from miasms and dangerous exhalations. High, porous ground is particularly to be recommended. It is sometimes possible to render a damp soil healthful by thorough drainage and cementing. The house should always be built of good material, and all the rooms should receive the light of day and as much sunshine as possible. In winter the rooms should be well warmed, but not overheated, and at the same time free ventilation should be made possible. Bathrooms in sufficient number should be in all model tenement houses, and each family should have its own water-closet, which, of course, must always be kept in good condition.

Sanitary Dwellings

In labor colonies and densely populated tenement districts, where modern bathing facilities cannot be easily installed, there should

be public places where, for a moderate price, people can enjoy the cleansing and refreshing luxury of a warm or cold bath.

Bathing Facilities.

In factories, workshops, big stores, etc., there should always be a sufficient number of spittoons, preferably elevated and of unbreakable material. Wherever such precautions are taken and some conspicuous signs, forbidding expectorating on the floor, put up, and if necessary making it punishable by law, promiscuous spitting will soon cease, and an important point in the combat of tuberculosis will be gained.

All employees, men and women of whatever class, should be allowed ample and regular time for their meals, which should never be taken in the workshops. Special rooms should be kept for that purpose. Opportunity should be given to the workers to rest or walk in the open air for a little while after their meal. It is also of importance for the health of the laborer to wash his hands thoroughly before touching food, and proper conveniences should be provided for that purpose. Factories, workshops, large stores, etc., should, of course, be well ventilated, but it is particularly necessary that they should be thoroughly aired after working hours. These precautions apply not only to large establishments, but to the smallest concern with one or two employees as well, and every employer should bear in mind that a healthy laborer is of greater value than one who is overworked, underfed, or badly housed. Lastly, employees should not be overworked. There should be reasonable hours for all, so that the laborer may enjoy the bodily and mental rest which is essential to the preservation of health. The germs of any disease, but particularly those of tuberculosis, will always find a more congenial soil for development in an overworked and enfeebled system. Child-labor, that is to say, the employment of children under fourteen years of age, in factories, workshops, mines, etc., should be prohibited by law. The child is more susceptible to tuberculosis than the adult, especially when its delicate growing organism is subject to continued physical strain.

Regularity of Meals.

Overwork.

Child-labor.

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CHAPTER XVI.

What can the Farmer and Dairyman Do to Diminish the Frequency of Tuberculosis among Animals, and Thus Indirectly Stop the Propagation of the Disease among Men?

The farmer or dairyman who employs help should, of course, be as anxious for their physical welfare, their proper housing and proper food, as the employer in the city. The dairyman or the farmer who keeps cows, should, however, be particularly desirous to help in combating tuberculosis among animals.

Everybody who has anything to do with cows should be acquainted with the nature of tuberculosis in cattle, also known by the name "bovine tuberculosis." In animals as well as in man the direct cause of this disease is the tubercle bacillus. Bovine tuberculosis is prevalent in nearly every country. The symptoms of the disease are much like those in man. They begin with relatively slight functional disturbances. The way the germ of tuberculosis is transmitted from animals to men, and also from men to animals, has already been explained. The contagion, or rather the propagation, of the disease among animals takes place in various ways: First, by drop infection, that is to say, little particles which are expelled during the seemingly dry cough. Secondly, by the discharge from the lungs, or also from the glands of the throat, coughed up in the ordinary way. Thirdly, through tuberculous matter coming from the bowels. Fourthly, through secretions coming from the sexual organs (vagina and uterus). Fifthly, through the milk if the udder is tuberculous, or if the whole body of the animal is invaded by the disease. Finally, the disease may be directly transmitted from the tuberculous cow to the calf.

Infectio of Cattl

As to the frequency of the various ways in which the contagion takes place and the best methods of prevention, the author does not believe that he can do better than to copy some of the very "Practical Suggestions for the Suppression and Prevention of Bovine Tuberculosis," issued by Dr. Theobald Smith, of the Bureau of Animal Industry in Washington:

ppression and revention f Bovine uberculo- sis.

"Fully nine-tenths of all diseased animals examined have been infected by inhaling the tubercle bacilli, dried or suspended in the air.

"Fully one-half of all diseased animals examined have been infected by taking tubercle bacilli into the body with the food. This implies that both food and air infection are recognizable in the same animal in many cases.

"Animals are infected, though rarely, during copulation. In such cases the disease starts in the uterus and its lymph glands, or in the sexual organs and corresponding lymph glands of the bull.

"Perhaps from one to two per cent. of all calves of advanced cases are born infected. Among the two hundred cases of tuberculosis, including all ages, which have been examined by the writer, there are about two per cent. in which the disease is best explained as having been directly transmitted from the mother during or before birth.

"We may define the dangers of infection somewhat more definitely by the statement that in any herd, even in those extensively infected, only a small percentage of the diseased animals, namely, those which are in an advanced stage, or such as have the disease localized from the very beginning in the udder, or the uterus, or the lungs, are actively shedding tubercle bacilli. It is these that are doing most, if not all, of the damage by scattering broadcast the virus.

"Disease of the udder is particularly dangerous, because the milk at first appears normal for some weeks, and therefore would be used with impunity. Moreover, the tubercle bacilli in the diseased gland tissue are usually numerous.

"Similarly, in tuberculosis of the uterus the vaginal discharges may contain many tubercle bacilli. These deposited anywhere may lead to the extensive dissemination of the virus, or it may be carried by the bull to other cows. A diagnosis may be made by the examination of any existing discharge for tubercle bacilli.

"The foregoing statements apply to individual herds only. To what extent does the danger extend beyond the diseased herd to others in the neighborhood? To this we may give the general

answer that there is no danger unless the animals mingle on the pasture or in the stable. Tubercle bacilli are not carried in the open air, or if they are their numbers are so small that the danger of infection is practically absent.

"It is also highly doubtful whether they are ever carried in sufficient numbers by third parties from place to place to become in a sense a danger. The reasons for this must be sought for in the tubercle bacillus itself. The diseased animal is the only manufacturer of tubercle bacilli, as well as the chief disseminator. Tubercle bacilli, after having left the body of the cow (and usually in small numbers), do not increase in nature, but suffer a steady decrease and final extermination in four to six months at the longest. Only after they have entered the bodies of susceptible animals, do they again begin to multiply. Hence, with this disease, the only danger to other herds lies in direct association, or in the transfer of a diseased animal or of milk from such an animal. The great danger exists in the immediate surroundings of the infected, and loses itself as the distance increases.

"PREVENTIVE MEASURES.

"The suggestions to be recommended are not to be considered as taking the place of any more sweeping and radical measures which have been contemplated by some States, and are actually being tried in others. We wish them to be considered simply as of educational value to the owners of cattle in their efforts to repress and stamp out the disease. The aid of the Government in this matter is a question to be discussed by itself. Without individual co-operation and sacrifice, directed by an intelligent understanding of the disease in its various aspects, any efforts on the part of the Government are likely to prove abortive, owing to the enormous interests involved.

"*Removal of Diseased Animals.*—This is the essential requirement in the suppression of tuberculosis. We have already stated that only in the diseased animals the tubercle bacilli multiply. Hence, if these are removed and the stables thoroughly disinfected, so that any germs shed by them are destroyed, we are safe in concluding that the disease has been suppressed.

"The disease in the early stages can be detected only with the aid of tuberculin. In the advanced stages most careful observers will probably recognize it, or at least suspect it, without the use of tuberculin. Tuberculin, therefore, has become indispensible in giving the owner an idea of the inroads the disease is making in his herd, and in distinguishing the infected from the non-infected. Tuberculin reveals to us all stages, from the earliest, most insignificant changes, when the animal is outwardly entirely well, to the gravest and most dangerous types of the disease. Tuberculin does not, as a rule, discriminate between these cases. Hence, those who use it as a guide must not be disappointed when, after having killed the suspected ones, they find that many are in the earlier stages of the malady. Tuberculin, moreover, is not infallible. A small percentage of cases of disease are not revealed by it. On the other hand, a sound animal now and then gives the reaction of tuberculosis. These lapses must be borne in mind in using tuberculin. In spite of them, however, tuberculin must be considered as of great value in revealing tuberculosis not recognizable by any other means during life.

"The question next arises, What shall be done with the infected animals? This question is really composed of two distinct questions whose combination is mainly the cause of the present perplexity. From the standpoint of the agriculturist alone the matter is simple enough. The infected animals might be separated at once from the non-infected. The worst cases should be killed and buried deeply or burned. Those without outward signs of disease might be fattened for the butcher and inspected at the abattoir. This is the recommendation given by Nocard, a prominent French authority, and generally followed in European countries. But at this point public health appears and demands the prompt and complete destruction of all infected animals, however mild the disease, or, if the animal be not destroyed, the rejection of the milk of all infected animals. The interests of the stock owner and of public health are thus diametrically opposed. If the demands of public health were in every sense justifiable, from a strictly scientific standpoint, there could be no question as to an entire submission to its demands. But the case is not so simple, and gives room for

diversity of opinion. Leaving the public-health aspect of the question aside for the moment, let us return to the farmer's side of it. After all infected animals have been segregated or killed, as the case may be, and the stables disinfected, the remaining healthy animals should be retested with tuberclin within a certain period of time, from three to six months after the first test, to make sure that no disease has been overlooked. Future repetitions must be recommended, according to our present knowledge, for some cases may have been missed by the tuberculin, or the disease germs may possibly be reintroduced by tuberculous human beings, or by tuberculous cats, dogs or other domesticated animals.

"All animals introduced into a herd must have been tested and found to be sound beforehand. This is such a self-evident proposition that it needs no comment.

"In the absence of the tuberculin test, or of organized official inspection, the stock owner should carefully and promptly remove from his herd and have destroyed:

"(1) All animals which show emaciation, with coughing, and any suspicious discharges from the nose.

"(2) Those animals with enlarged, prominent glands about the head (in front of the ears, under or behind the lower jaw), or enlarged glands in front of the shoulder, in the flank, and behind the udder, and all animals having swellings on any part of the body which discharge a yellowish matter and refuse to heal.

"(3) Animals with suspected tuberculosis of uterus and udder.

"*Disinfection and other Preventive Measures.*—It will probably require more or less time before the use of tuberculin will have become generally established. Hence, preventive measures of a general character must still be kept in view for some time to come. These measures partly suffer shipwreck from the fact that it is difficult without tuberculin to recognize even advanced disease during life. Still, much can be done to reduce the amount of infection by following out certain general and specific suggestions which the renewed study of the disease has either originated or else placed on a more substantial basis.

"Perhaps the most important preliminary suggestion to be made is, that the owner of cattle should endeavor to familiarize himself

as much as possible with the general nature of tuberculosis, its cause, the ways in which the virus may leave the body of the sick and enter that of the well, and, lastly, the ways in which it spreads within the body. He will, by the acquisition of such fundamental knowledge, lift himself above the plane where quackery and specifics abound, and understand precisely what to expect after the disease has entered his herd, and how to meet the demands of public health. He should, however, make himself acquainted with the peculiar appearance of tuberculous growths in the body, and open every animal that dies, so that he may know to what extent his animals are dying of this malady. Wherever possible the services of the skilled veterinarian should be made use of. Sanitary precautions should begin with the removal of diseased and suspected animals, as stated above. This is the most essential requirement, for diseased animals are the only breeding places of the specific virus.

"After the removal of these, attention should be paid first of all to the stables. Here, during the long confinement of the winter months, when ventilation is all but suppressed, we may look for the source of most of the inhalation diseases so common in tuberculous cattle. Even when only a few cases of tuberculosis have been found, the stables should be disinfected by removal of all dirt and the subsequent application of disinfectants. Since tubercle bacilli are more resistant than most other disease germs, the strength of the disinfecting solution must not be less than as given. The following substances may be used:

"(*a*) Corrosive sublimate (mercuric chloride), one ounce in about eight gallons of water) one-tenth of one per cent.). The water should be kept in wooden tubs or barrels and the sublimate added to it. The whole must be allowed to stand twenty-four hours, so as to give the sublimate an opportunity to become entirely dissolved. Since this solution is poisonous, it should be kept well covered and guarded. It may be applied with a broom or mop and used freely in all parts of the stable. Since it loses its virtue in proportion to the amount of dirt present, all manure and other dirt should be first removed, and the stables well cleaned before applying the disinfectant. After it has been applied, the stable

should be kept vacant as long as possible. Before animals are allowed to return, it is best to flush those parts which the animals may reach with their tongues, to remove any remaining poison.

"(*b*) Chloride of lime, five ounces to a gallon of water (four per cent.). This should be applied in the same way.

"(*c*) The following disinfectant is very serviceable. It is not so dangerous as mercuric chloride, but is quite corrosive, and care should be taken to protect the eyes and hands from accidental splashing.

	Gallon
Crude carbolic acid	½
Crude sulphuric acid	½

"These two substances should be mixed in tubs or glass vessels. The sulphuric acid is very slowly added to the carbolic acid. During the mixing a large amount of heat is developed. The disinfecting power of the mixture is heightened, if the amount of heat is kept down by placing the tub or glass demijohn containing the carbolic acid in cold water while the sulphuric acid is being added. The resulting mixture is added to water in the ratio of one to twenty. One gallon of mixed acids will furnish twenty gallons of a strongly disinfectant solution having a slightly milky appearance.

"(*d*) Whitewash is not in itself of sufficient strength to destroy tubercle bacilli, but by imprisoning and incrusting them on the walls of stables they are made harmless by prolonged drying. Whitewashing should be preceded by thorough cleaning.

"Particular attention should be paid to the sides and ceilings of stables. All dust and cobwebs should be periodically washed down. Those parts coming in contact with the heads of cattle, stanchions, halters, troughs, etc., should be frequently cleansed and disinfected, even when they have not been used by diseased cattle.

Hygiene o Stables.

"The removal of virus from the stables should, furthermore, be promoted by the regular removal of manure and by abundant ventilation. Good air has the effect of diluting infected air, and thereby reducing the chance of inhaling dried, floating tubercle bacilli, or at least of reducing the number inhaled. It likewise improves the vigor of the confined animals, and hence increases the resistance to infection.

"Cattle should not be placed so that their heads are close together; each animal should have plenty of room (each cow should have at last six hundred cubic feet of air space) and occupy the same place in the stable at all times. These precautions will prevent the nasal, lung, or vaginal discharges from one animal striking the head or soiling the feed of another. It is true that it is impossible to prevent animals licking each other outside of the stable, but it should be remembered that prevention must begin with the removal of all cases which are suspected of discharging tubercle bacilli. Stables should, furthermore, be carefully protected from the expectorations of human beings affected with tuberculosis of the lungs.

"Cattle should be housed as little as possible. The pasture has the effect of greatly reducing the chances of infection by a more or less rapid destruction of the virus, as well as by increasing the vigor of the animals through muscular exertion in fresh air. To what extent animals may pick up the virus on fields, it would be difficult to estimate. That it is perfectly possible cannot be gainsaid. A tuberculous animal may soil the ground over which it passes, and other animals may take up the virus with the food soon after.

"It is not likely that the virus remains alive long enough on the ground to become dried and ready for inhalation. The action of sunlight, the alternate wetting and drying which goes on in nature, may be looked upon as destructive agents. Even if the tubercle bacilli became speedily dried, the great diluting effect of the open air would reduce to a minimum the chances of inhaling the virus.

"Among the other dangers deserving attention is the infection of food and water. Drinking troughs should be so arranged that the surface water is constantly flowing away. Discharges from the nose or mouth left floating on the surface may be drawn in by healthy cattle while drinking. Each person must in such cases use his own judgment and ingenuity to prevent infection, in accordance with the quantity of water at his disposal.

"To restrict the dissemination of the disease among young stock, the safest plan is to bring skimmed milk and other dairy products to the boiling point before feeding them. If the cows are positively known to be healthy, this may be unnecessary, but where

any doubt exists the heating should be resorted to. Such a precaution will, furthermore, reduce scouring among calves, which is probably due in a great measure to bacteria in the food.

"In presenting the foregoing suggestions the writer has endeavored to keep in view two conditions: (1) That in which tuberculin is not within reach and only unusual watchfulness can be exercised in separating suspected animals from the healthy, and (2) that in which tuberculin is tried, but with a view that it is not wholly infallible and requires to be seconded with other precautionary measures. If tuberculin is infallible, most of the suggestions made fall to the ground as unnecessary, unless the disease can be readily introduced by man or diseased animals of other species, a possibility of wholly unknown dimensions at present."

We will only add to these valuable instructions that tuberculin is a substance invented by Prof. Robert Koch for the purpose of diagnosing tuberculous diseases. It is a fluid made from cultures of the germs of tuberculosis, but it does not contain either dead or living germs of tuberculosis, because it has been sterilized by heating, thus killing the germs; and filtered through porcelain, so that after they are destroyed they are completely removed from the fluid.

Tuberculin Test.

By *tuberculin test* is understood the process by which tuberculin is applied to an animal for the purpose of determining whether it is free from, or afflicted with, tuberculosis. In making the test it is necessary to determine the normal temperature of the animal, and then inject a small quantity of the tuberculin. If the animal has tuberculosis, its temperature will rise within from eight to sixteen hours after the injection, but if it does not suffer from tuberculosis, the temperature is not influenced.

The tuberculin test should always be applied by a competent veterinarian, and no danger will arise to the animals, for, when properly applied, the healthy animal is never affected thereby.

Of course, there are conditions in animals, as there are in man, which predispose to the disease. The breed as well as the conditions under which an animal is compelled to live determine its susceptibility. We believe it to be perfectly safe to say that the suggestions made regarding the prevention of tuberculosis in man are also applicable to animals. Light, air, cleanliness, proper food,

and sufficient exercise are essential in combating tuberculosis in the bovine race. After a herd has been freed from its tuberculous members and a strict hygiene has been instituted, with plenty of room for every animal, there will be little danger of a new outbreak of the disease.

Predisposing Conditions in Cattle.

Of course, as already mentioned in Dr. Smith's instructions, it is essential that no consumptive, no matter in what stage of the disease, should be permitted to enter these stables. To have cows attended to by tuberculous help is absolutely dangerous. Expectorating on the floor of a stable should be as strictly prohibited as in the dwelling of man. If there is any disease such as diarrhœa, fever, etc., about the dairy or farm the physician should be called in. Medical advice should also be sought in cases of slowly healing ulcers and sores. Scrupulous cleanliness in the handling of milk and butter in dairies is, of course, essential and all the vessels used should be thoroughly cleaned with hot water before being used again.

Tuberculosis among swine is not so rare as is usually assumed. While the disease among cows may not always be recognized by the loss of fat and general bad appearance (for even tuberculous cattle can be fatted), in swine tuberculosis manifests itself at a very early date by a marked emaciation. Very often these swine are then quickly slaughtered and the meat made into sausages. That through such procedures the health of the consumers is endangered is evident, especially when one considers that many kinds of sausages are eaten without being cooked. Tuberculosis among young swine manifests itself most frequently in the form of intestinal troubles. The main symptoms of the disease are the loss of flesh and bad appearance already mentioned, a pale mucous membrane—that is to say, the inner lining of the mouth loses its reddish color—a marked diarrhœa, flatulency and discharge of gases. If there is tuberculosis of the lungs, cough and vomiting are additional symptoms. In both forms of tuberculosis a swelling of the glands around the neck is often observed. When these animals are slaughtered, one can see little tubercles or elevations and ulcerations along the inner walls of the guts, and on the surface of the lungs. As soon as the disease is discovered

Tuberculosis in Swine.

among the animals, the sick swine should be separated from the healthy ones. A veterinarian should then be consulted, who will give directions for the destruction of the tuberculous meat and the disinfection of the sties.

The prevention of tuberculosis among swine is not so difficult when one thinks of the causes of the disease. A sucking pig can be infected by a tuberculous sow. The most frequent source of tuberculosis among hogs, however, comes from feeding them on skimmed milk and other dairy products from tuberculous cows. A few cases are also known where hogs became tuberculous from eating the expectoration of consumptives.

Tuberculosis of horses is rare and difficult for a layman to recognize. When a horse with a seemingly good appetite has a bad appearance and loses flesh, tires easily, and is short of breath, one should think of tuberculosis. Much urinating and a high temperature (fever) are additional symptoms of tuberculosis in horses. When such conditions are discovered, it is, of course, self-evident that the animal should be isolated until the veterinarian arrives.

Tuberculosis in Horses and Other Animals.

Tuberculosis among goats is extremely rare. In the few cases which have been recorded the origin of the disease could be traced to the ingestion of milk from tuberculous cows. Dogs take the disease when living with consumptive people, and the infection probably takes place through ingesting and inhaling infectious substances.

CHAPTER XVII.

What are the Occupations in which Tuberculous Invalids, Even in the First Stages of the Disease, Should Not be Employed?

There are certain occupations, especially those that require a long sojourn in the open air every day without too much bodily exertion, which tuberculous invalids in the first stages of the disease may be permitted to follow in their own interest as well as in that of their fellow-men. There are, on the other hand, certain occupations which should never be permitted to consumptives. What we have said in the preceding chapter concerning tuberculous help about cow stables and the possibility of their propagating the

Handling of Food Substances, Bread, etc.

disease, is, of course, also applicable to milk dealers, butchers, cooks, bakers, confectioners, and all who have to do with the preparation or sale of food substances. For bread to be handled by tuberculous bakers or bread dealers is dangerous. The possibility of infection is evident when one considers through how many hands the bread passes before it enters the mouths of the consumers, and that, probably, nobody ever thinks of cleaning the bread before eating it. A very recommendable practice is now in vogue in some of the large bakeries in connection with the handling and transporting of bread. The moment the bread comes out of the oven, while it is still too hot to be handled, it is placed, by the aid of a shovel, upon a piece of wrapping-paper large enough to envelop the whole loaf. By twisting the two ends of the wrapper the bread is completely enclosed.

The most scrupulous cleanliness should be practised wherever articles of food are handled or exposed for sale. We have already mentioned in Chapters XIII. and XIV. that certain occupations, such as those of stone-cutters, printers, and cigar-makers, render weak individuals particularly prone to consumption; therefore, any one inclined to this disease should, in his own interest, never pursue such an occupation.

Tuberculosis among Caged Animals.

Lastly, we must mention one more occupation in which tuberculous individuals should never engage, namely, that of keepers of animals in menageries. Large animals, such as lions and tigers, also the larger and smaller classes of apes, are subject to tuberculosis when in captivity. There is no doubt that an ape-house, visited by thousands of people, old and young, every day, must be considered dangerous and capable of propagating the germs of tuberculosis among the visitors if some of the animals should be tuberculous.

CHAPTER XVIII.

What are the Main Signs and Symptoms of the Beginning of Tuberculosis of the Lungs or Consumption?

These symptoms are often so obscure and show themselves so gradually that they are frequently overlooked by the patient as well as by his friends. Since, however, the cure of the patient

depends upon the early discovery of the disease and a timely treatment, we will here describe such symptoms as may be recognized by the layman.

The man, woman, or child with a hereditary predisposition to consumption often has a narrow chest and stooping shoulders. While a slow, gradual emaciation and loss of weight may at times be observed, this is by no means a rule. One occasionally sees tuberculous patients who present a relatively good appearance during the first stage of the disease. Paleness of the skin, at times with bright red cheeks, is, however, a rather common early sign. A marked inclination to frequent catarrh is often present, and the character and disposition of the individual may change when the disease comes to an outbreak. There is a dislike to work, also to the pleasures and occupations which the invalid formerly loved to pursue. He will probably also complain of getting tired easily. In the afternoon hours he will have a light fever, and a hacking cough in the morning or evening. Dyspepsia and loss of appetite, palpitation of the heart and pains in the chest, are also symptoms of importance. Of course, some or several of these signs and symptoms may also be the indication of the approach of other diseases than tuberculosis of the lungs. The presence of such symptoms should, however, serve to all, whether predisposed to tuberculosis or not, as a warning to seek medical advice. Especially persons who cough more or less continually should submit themselves to a thorough examination. The science of medicine has made such progress that the recognition of a beginning tuberculosis of the lungs no longer presents any difficulty; therefore, whenever there is a suspicion of the beginning of consumption, the calling in of a physician may assure cure and restoration to health, and if no tuberculosis is present the medical examination will quiet unnecessary fears.

Importanc of Early Detection c Consump- tion.

CHAPTER XIX.

WHAT ARE THE EARLY SYMPTOMS OF OTHER FORMS OF TUBERCULOSIS?

In case of tuberculosis of the throat, the general symptoms are about the same as those just described for the beginning of con-

sumption of the lungs; but in addition there will be a certain hoarseness and roughness of the voice. Pain in swallowing very hot and cold liquids or hard food may also sometimes be observed in the early stage of this disease.

Early ymptoms f Throat uberculo- sis.

The early symptoms of tuberculosis of the bones and joints manifest themselves in lameness and easy tiring of the arm or leg affected. A light pressure in the region of the joints causes a sudden severe pain. If the spinal column is affected, the symptoms will depend upon the location of the vertebra which is attacked by the disease. For example, if this should be in the region of the neck, there will be difficulty in swallowing, in breathing, or a frequent dry cough. If any one of the vertebræ in the region of the chest is affected, a feeling of constriction like a tight band around the chest will be observed, accompanied often by digestive troubles. If the seat of the disease is the lower portion of the spinal column, there will be irritation of the bladder and lower bowels, an inclination to much urinating, and radiating pains toward the hips.

It is, of course, self-understood that when any of these symptoms are discovered the physician should be called in, for only through the most careful treatment can a patient be saved from a lasting deformity.

arly Signs of Scrofula.

The bone-and-joint tuberculosis is most frequent during childhood. The same may be said of that form of tuberculosis which is known as scrofula, and which might be considered almost exclusively a disease of children. The scrofulous child is usually pale with flabby skin and muscles. The glands around the neck are swollen, and skin disease, sore eyes, and running ears are frequent symptoms. The little patient usually manifests a phlegmatic condition, but we may also find some that are nervous and irritable. The latter often have a particularly white, delicate skin, which makes the veins visible. Fever may be observed in some children. In view of the happily very curable nature of scrofulous affections, the importance of the early recognition and of the timely and judicious treatment is, of course, self-evident.

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CHAPTER XX.

How can Children be Protected from Scrofula and Other Forms of Tuberculosis?

Hereditar Causes of Scrofula.

Scrofula may be either hereditary or acquired. The hereditary type comes from parents who are scrofulous, tuberculous, or syphilitic. It has also been proved that when one or both of the parents were alcoholics, that is to say, addicted to the chronic use of intoxicants, their offspring has become scrofulous.

All this shows how dangerous it is for weakly and sickly persons, or those afflicted with any of the above enumerated diseases, to marry and have children before being completely restored to health. We wish to state again that all these diseases can be cured by timely medical treatment. To be cured from alcoholism the physician's help is not always necessary; in most cases it requires only the earnest and honest endeavor to abstain.

Acquired Causes of Scrofula.

The causes of acquired scrofula in children are to be sought in unhygienic environments and conditions, such as unhealthy dwellings, damp, crowded, unclean, and badly ventilated rooms, much indoor life, underfeeding, exposure, and colds brought about by insufficient clothing and lack of care. In fact, one may say the same conditions which produce favorable soil for the invasion of the germs of consumption in the adult are conducive to the development of scrofula in children. How these conditions are to be overcome we have endeavored to explain in Chapters XII., XIV., and XV., and we will speak of them in their sociological aspect in Chapter XXVIII.

On page 41 we stated that it is extremely rare for tuberculosis to be directly transmitted, and that in children the contagion nearly always takes place while they are very young. We will now explain the various ways in which a healthy child may become tuberculous, and learn therefrom how to protect it from the danger of getting the disease, either by inhalation, ingestion, or inoculation.

The most common modes of infection during early childhood are perhaps the following: The consumptive mother caresses the

child and kisses it on the mouth; she prepares the food, tasting it to judge its temperature and flavor through the same rubber nipple or with the same spoon the child uses, and thus unconsciously conveys the germs of her disease from her own mouth to that of the child. Later on the child will play on the floor of the room, and should there be a consumptive in the family who from carelessness or ignorance is not prudent in the disposal of his expectoration, the child is indeed likely to be infected. The little one, while playing on the floor, may with great facility inhale the bacilli floating with the dust in the air, and can thus acquire tuberculosis by inhalation, the full development of which may only take place in later years, when the origin will not be thought of. Again, the little child touches everything it can take hold of, infecting its fingers thoroughly, and by putting them in its mouth tuberculosis by ingestion may result and gradually develop into consumption of the bowels. Lastly, should the child's nails be neglected, it may scratch itself with the infected fingers, and thus inoculate its system with the disease. Tuberculosis of the skin, or lupus, may result from such an unfortunate accident.

Tuberculous Infection During Early Childhood.

To prevent these infections during childhood is certainly possible by taking the following precautions: Not only should consumptives be religiously careful with their expectoration, but they should associate as little as possible with young children, and stay away from playrooms and playgrounds. We repeat that to kiss children on the mouth should never be allowed, and the little ones should be taught never to kiss nor be kissed by strangers, They should be kissed by their own friends and relatives as little as possible, and then only on the cheeks. The floor on which the child plays should be kept scrupulously clean. Carpets in such a place are an abomination; they only serve as dust and dirt collectors, and not infrequently harbor the germs of contagious diseases. The hands and nails of little children should be kept as clean as possible.

Kissing Unsanitary.

Expectorating on playgrounds should be considered a grave offence and should be punished accordingly. These playgrounds should be kept clean, as free from dust as possible, and daily strewn with clean sand or gravel.

Clean Playgrounds.

CHAPTER XXI.

Can Tuberculosis, Especially in Its Pulmonary Form, or Consumption of the Lungs, be Cured?

Celebrated Men Who were Cured of Consumption.

This question can be answered with a very decided Yes. Of eminent men of the past and present, who in their youth or early manhood were declared to be consumptive, but who attained, nevertheless, a more or less advanced age, may be mentioned the German poet Goethe, Napoleon the First, and our own Peter Cooper. Dr. Hermann Brehmer, one of the foremost German physicians, was a consumptive when he started the first sanatorium for tuberculous patients in 1859, over which he presided for more than thirty years with great success. His most celebrated pupil, Dr. Dettweiler, entered his sanatorium as a consumptive, became Brehmer's assistant, and has since been for twenty-five years active as the medical director of the Falkenstein Sanatorium. The late Dr. Péan, of Paris, who died at the age of sixty-five, was declared phthisical when twenty. Francis Coppée, one of the greatest poets of modern France, takes delight in telling that more than twenty years ago a life insurance company refused to insure him, because he was declared consumptive, and how badly the company ought to feel now, having lost his premiums for over twenty years! There are thousands of such cases where people, once declared consumptive by competent physicians, have ultimately recovered, and pursued their vocations in life with unimpaired vigor for many years afterward.

Results Obtained in Sanatoria.

The statistics from sanatoria for consumptives, where patients in all stages of the disease are received, show that twenty-five per cent. leave as absolutely cured, and forty to fifty per cent. leave much improved, many of them being again capable of earning their living. In institutions where only patients in the early stages of the disease are received, as many as seventy to seventy-five per cent. have been cured.

CHAPTER XXII.

HAVE THE FORMER PATIENTS WHO LEFT SANATORIA OR SPECIAL INSTITUTIONS FOR THE TREATMENT OF CONSUMPTION AS CURED, REMAINED LASTINGLY SO?

That a lasting cure of consumption is possible we have shown in the preceding chapter by enumerating the names of some great men who were consumptive in their youth, but were cured and lived a long and useful life, some even attaining a ripe old age.

Reports from Jettweiler, Wolff, Hauffe, Von Ruck, and Baldwin.

Concerning the duration of cures accomplished in sanatoria and special hospitals for consumptives, we will reproduce some of the statistics published in recent years. Among 99 patients discharged from the Falkenstein Sanatorium as cured, 72 were well at the time the inquiry was made, which was three to nine years after the patients had left the sanatorium. In 15 cases a relapse had occurred, but 12 of these patients had improved again; 12 of the 99 had died. Dr. Wolff's inquiries concerning 95 patients discharged as cured from Brehmer's institution in Goerbersdorf, resulted in the following: 5 were alive and well after a period of from 21 to 29 years; 52 were well after a period of from 12 to 21 years; and 38 were well after a period of from 7 to 12 years. Dr. Hauffe, of the St. Blasien Sanatorium in Germany, wrote in 1891 to 324 former patients who had left the institution between 1879 and 1889. Forty-six did not reply, 5 were reported dead, 12 had grown worse, 201 thought themselves still relatively cured, and 72 were absolutely cured. Dr. von Ruck, of Asheville, N. C., reported to the author of this essay that he had written to 650 of his former patients who had left the sanatorium from one to three years before; 457 responded, directly or through friends. Of these, 67 felt absolutely cured; 70 felt relatively cured; 258 felt still improved; 62 got worse or had died. Dr. E. R. Baldwin, of Saranac Lake, N. Y., reported recently that at the Adirondack Cottage Sanatorium they were in constant correspondence with 115 patients who had been discharged within the last ten or twelve years, and while a few had relapsed slightly, the majority were well at

their homes. Of course, these reports do not, and cannot, correspond exactly. With the exception of the last-named institution (Adirondack Cottage Sanatorium), which only takes patients in the earlier stages, those sanatoria receive patients for treatment in all stages of the disease. But, as a whole, these statistics are certainly encouraging, and the question "Can consumption be lastingly cured?" may also be answered with a decided Yes.

Pathological Proof of the Curability of Consumption.

Not only the living but even the dead give us absolute proof of the curability of tuberculosis of the lungs. In the autopsies (post-mortem examinations) of many individuals who have died of other diseases than consumption, healed scars are found in the lungs, giving the visible evidence of a healed tuberculosis. Statistics concerning this occurrence show that the number of cases of healed tuberculosis of the lungs, discovered at autopsies, is nearly twenty-five per cent.

Other Forms of Tuberculosis Also Curable.

Other forms of tuberculosis are also curable, particularly the forms which manifest themselves as scrofula, or diseases of the bones or joints in children. The results which have been obtained in sea-coast sanatoria and special hospitals, of which a number exist in France, Germany, Holland, and Italy, are well-nigh surprising. According to a recent report of the general secretary of the Society for the Creation of Sea-Coast Sanatoria for Scrofulous and Tuberculous Children in Germany, no less than fifty per cent. of these little ones leave those institutions perfectly cured.

We do not think it an exaggeration to say that of all chronic diseases tuberculosis is the most curable, and of late years the most frequently cured. After these glad tidings concerning the curability of tuberculosis in general, and particularly of the once so very much feared tuberculosis of the lungs or consumption, let us ask *how* consumption is treated and cured.

CHAPTER XXIII.

WHAT ARE THE MODERN METHODS TO TREAT AND CURE CONSUMPTION?

It is not cured by quacks, by patent medicines, nostrums, or other secret remedies, but solely and exclusively by scientific and

judicious use of fresh air, sunshine, water, abundant and good food (milk, eggs, meat, vegetables, fruit), and the help of certain medicinal substances when the just-mentioned hygienic and dietetic means do not suffice in themselves to combat the disease.

The thorough and constant supervision of the pulmonary invalid, the immediate intervention when new symptoms manifest themselves or old ones become aggravated or do not disappear rapidly enough, the prescribing of proper food and drink, can only be done by the thoroughly trained physician. Therefore, right here let us sound a note of warning; namely, that not the most beautiful climate nor the most delightful resort can cure the consumptive patient if he is not wisely guided in his treatment.

Sometimes this class of patients think that they feel well enough to no longer need to submit themselves to the control of their physician. They think that they may safely pursue pleasures, sometimes even excesses, or take up work just as well as healthy people. Such carelessness on the part of a recovering consumptive has many a time resulted in a serious relapse.

Strict Medical Supervision Essential to Cure.

The thorough belief in the curability of pulmonary tuberculosis, and the conviction that the hygienic and dietetic treatment under constant medical supervision could be most successfully carried out in an institution exclusively intended for that purpose, caused Hermann Brehmer, the German physician mentioned above among the illustrious men cured of consumption, to establish the first sanatorium for consumptives, at Goerbersdorf in Silesia (1859); although it must be said, in justice to the English medical world, that special hospitals for consumptives were erected in or near large cities as far back as sixty years ago. These "special hospitals" for consumptives in former years did not differ much from general ones, while a sanatorium for consumptives has many features by which it differs entirely from an hospital. Brehmer, in his day, maintained that such institutions should have particular climatic conditions, and should always be situated at a considerable elevation above the sea in order to obtain satisfactory results. The experience of more recent years, however, in Europe as well as in the United States, has shown that properly conducted sanatoria or modern special hospitals, erected in regions with no claims

Special Climatic Advantages Not Essential to Cure.

for special climatic advantages, obtained just as good results in the end as institutions situated in typical climatic resorts.

To give the layman an idea of what is understood to-day by a closed institution or sanatorium, exclusively intended for the treatment of consumptives, we will answer the following questions:

CHAPTER XXIV.

What is a Modern Sanatorium for Consumptives? And can Such a Sanatorium Become a Danger to the Neighborhood?

A modern sanatorium * for the treatment of consumptives is an institution usually situated in a healthy locality, somewhat elevated, relatively free from dust and traffic. Only patients suffering from tuberculosis are received. The greatest care is exercised everywhere, in buildings and surroundings, to avoid the possible transmission of the disease to employees, visitors, or the neighbors of the institution, and equally great care is exercised to prevent a reinfection of the patients themselves. All the precautions enumerated in Chapters IV. and V., which provide for the destruction of the infectious expectoration, are carried out with the utmost rigor in the sanatorium. A voluntary violation of rules, relating to the disposal of the expectoration, is followed by immediate dismissal of the offender.

Hygiene in the Sanatorium

The hygienic and preventive measures in these modern sanatoria are so thorough that it may be said one is in less danger of becoming infected with the germs of consumption there than anywhere else. It is of the rarest occurrence that any of the physicians, nurses, or employees in such an institution contract tuberculosis. It seems to us that this is a very good proof of how easily infection

* The word sanatorium is used in this essay in preference to the word "sanitarium" for the following reasons: Brehmer, the founder of the first institution of that kind, called it "Heilanstalt," which means a healing institution; and the word "sanatorium," from the Latin *sanare*, to heal, gives certainly a better equivalent to the German word than the word "sanitarium." This latter word is derived from the Latin *sanitas*, health, and is usually employed in this country to designate a place considered as especially healthy, a favorite resort for convalescent patients, or an institution for the treatment of mental or nervous diseases.

can be avoided when physician and patient work together to combat the tubercle bacillus, this great foe of mankind.

Mortality tatistics of Goerbersdorf and Falkenstein.

Another very interesting observation is that in localities where sanatoria for consumptives are situated, the mortality from consumption among the inhabitants of the respective villages has markedly decreased since the establishment of the institution. The splendid hygienic and preventive measures instituted in the sanatoria have been voluntarily imitated by the villagers, and as a result the mortality from pulmonary tuberculosis among the inhabitants has gradually decreased. Thus we are glad to be able to answer in the negative the question so important in the combat of tuberculosis as a disease of the masses, "Are sanatoria for consumptives a danger to the neighborhood?" From well-conducted sanatoria for consumptives no danger can arise to the surroundings. To confirm this statement by exact statistics, we will reproduce the data taken from the official documents of the two villages, Goerbersdorf and Falkenstein, where five of the largest German sanatoria have been located for many years.

In Goerbersdorf the deaths from consumption were:

1790–99	14	1840–49	6
1800–09	5	1850–59	7
1810–19	9	1860–69	4
1820–29	9	1870–79	5
1830–39	8	1880–89	5

The sanatorium in Goerbersdorf was established in 1859, and since then the population of the village of Goerbersdorf has doubled.

In the village of Falkenstein died from tuberculosis:

Before the Establishment of the Sanatorium.		After the Establishment of the Sanatorium.	
1856–58	17.2 per 100	1877–79	17.0 per 100
1859–61	7.7 "	1880–82	14.6 "
1862–64	22.6 "	1883–85	6.0 "
1865–67	14.0 "	1886–88	5.0 "
1868–70	16.7 "	1889–91	13.9 "
1871–73	21.0 "	1892–94	15.1 "
1874–76	33.3 "		

Prolonged Rest Cure n the Open Air.

The patients in such a sanatorium live, so to speak, day and night in the open air. During the day they lie on lounging chairs on the open verandas and take walking and breathing exercises, and at night they sleep, of course, with the windows open. It is

surprising how easily consumptives get accustomed to the prolonged sojourn in the open air. Neither change of weather, cold, rain, snow, nor even wind, providing it is not too strong, hinders

FIG. 19.—Rest Cure in Winter. Adirondack Cottage Sanatorium.

the patients from spending most of their time on the piazza, porch, or rest-cure gallery. Observations made by the house physicians in sanatoria prove that the change of weather has little influence on the trained consumptive patient, and that the rest cure on the galleries of the sanatorium can be successfully carried out in winter or summer, rain or shine. When it is very cold patients cover themselves a little more with blankets or furs. Dr. Andvord, of the Tonsaasen Sanatorium, reported that his patients remained in the open air from five to nine hours a day at a temperature of

FIG. 20.—A German Rest-Cure Gallery.

13° F. below zero, and felt very well. Similiar reports come to us from that excellent American institution, the Adirondack Cottage Sanatorium, under the direction of Dr. Edward L. Trudeau, the pioneer of the sanatorium treatment in the United States. We reproduce a photograph (Fig. 19) taken on a winter day at that institution, showing how well and comfortable the patients are in spite of the cold. We also give a typical German rest-cure gallery or "Liegehalle" (Fig. 20), and finally a picture representing the rest cure in summer in the woods at a sanatorium in the Black Forest in Germany (Fig. 21). The latter shows how the patients in a sanatorium know how to have a good time. One must not

think these institutions dreary and cheerless places. The majority of the patients do well, as a rule, and progress favorably toward recovery. As a consequence they feel happy and impart their joy

FIG. 21.—Rest Cure in the Woods.

and good humor to the rest, thus helping to keep all the patients in good cheer.

Discipline.

The discipline in these institutions deserves by no means to be considered an objectionable feature. Discipline in a sanatorium for consumptives is as essential in the interest of the patient as for everybody else. The rules and regulations of the institution are for the common good. The physicians and nurses have, as a rule, the patience, forbearance, and devotion which their calling requires; but when it is necessary in the interest of the patients and their environments, the physician must have the right to make his authority felt. A sanatorium should not only be a place where a patient becomes cured, but also a place where he should learn some lessons for the future. All that he will have learned from the rules and regulations, and the advice of the physician concerning how to protect himself and others from contracting the disease, how not to take cold, and how not to lose what he has gained, are precious lessons which he will take home with him.

Relation of Patient and Physician.

The physician of the consumptive, whether in a sanatorium or at home, must be the friend of the patient, and have his unlimited confidence. In all such questions as marriage, sexual relations, and childbirth, the physician's advice should be sought. Much unhappiness and family misfortune can often be avoided by asking and conscientiously obeying the physician's advice. One of the main features of sanatorium treatment is ample nutrition, one might even say overfeeding. The principal meals are usually taken in well-ventilated dining-rooms, the lunches on the piazzas or on the rest-cure galleries. Many patients, in order that they may gain more rapidly in weight and strength, receive an additional quantum of fresh milk daily.

On arriving at the institution every patient is carefully examined and weighed by the physician, and this process is repeated at regular intervals during the entire stay of the patient at the sanatorium. The physician in charge or one of his assistants keeps regular office hours for the convenience of the patients. Those who are unable to be up are visited twice a day by one of the physicians of the institution. Specially constructed rooms for the application of cold water, one of the means of treatment, are usually

located in the basement, or the apparatus is installed in a neighboring building. A pharmacy, a laboratory, and a room for the treatment of throat diseases usually completes the equipment of a large sanatorium.

To enable the poorer classes to avail themselves of the advantages of institution treatment for consumptives, noble-minded men and women, philanthropists, statesmen, and physicians have in recent years been instrumental in creating in many parts of Europe and in some parts of the United States so-called State or people's sanatoria (Volksheilanstalten).

CHAPTER XXV.

What Are State Sanatoria? And What Are "Volksheilanstalten" or People's Sanatoria?

A State sanatorium in the United States means an institution for the exclusive treatment of patients suffering from pulmonary tuberculosis, created by the funds of the State and supported entirely or in part by the State. The first State sanatorium in America was erected a few years ago near Rutland, Mass. In this institution patients pay fifty cents per day. Recently other States, New York, New Jersey, Iowa, Illinois, Maine, etc., have projected the building of similar institutions.

People's sanatoria in the United States are institutions intended for the poor and people in moderate circumstances, erected and maintained by private philanthropy. While in some institutions patients receive medical treatment and board gratuitously, in others they are supposed to pay part of the expense.

People's sanatoria in Germany have a somewhat different meaning. There, the moment an individual enters upon the career of an ordinary laborer or servant, he is obliged to be insured against sickness, accidents, and old age. If he develops tuberculosis, he is immediately sent to one of the many sanatoria of that country. The government authorities, who are at the head of these state insurance companies, have long since learned that by timely treatment in a sanatorium the tuberculous individual is most speedily and lastingly cured, and consequently with the least expense.

State Insurance of Consumptives.

Thirty-seven of these government insurance companies have, according to their published figures for 1897, collectively assisted 4,480 consumptives, of whom 4,432 were sent to subsidized sanatoria. Nearly all these state insurance companies contribute to the funds of such establishments; some have found it to their advantage to erect special sanatoria of their own. For the year 1897 these state insurance societies of Germany invested altogether 1,300,000 marks in sanatoria for consumptives, and in 1898 a fund of between three and four millions was destined for that purpose.

Urgent Need of State and People's Sanatoria.

To discuss whether such state invalidity insurance companies are practicable or feasible in this country does not come within the scope of this work. Still less can we enter into a discussion of why private life insurance companies will not insure persons among whose near relatives consumption has occurred, in spite of the evident curability of the disease. While it is most gratifying to note that some States have undertaken to care for their consumptive poor, and while noble men and women have privately undertaken to care for some of those unfortunate sufferers, there is yet a great deal to be done. In view of the great number of consumptives with little or no means in our thickly populated States, it is evident that the existing institutions are like a "drop of relief in an ocean of woe." Thus let us hope that the good work will go on, and that the new century will see the multiple creation of State and people's sanatoria in the United States.

That such special institutions and thorough hygienic measures are well calculated to combat tuberculosis as a disease of the masses, we shall try to prove in the following chapter.

CHAPTER XXVI.

What Evidence Exists That by Taking Care of Consumptives in Special Institutions and by Hygienic Measures, Tuberculosis as a Disease of the Masses can Really be Successfully Combated?

In England there have existed special institutions for the treatment of consumptives, that is to say, hospitals and sea-coast sanatoria, in relatively large numbers, for over fifty years. As a result

of the maintenance of these institutions and the enforcement of a most excellent general public hygiene, it was possible to reduce the mortality from tuberculosis during the last years in a most surprising manner, and more rapidly than in any other country of the world. According to the following statistics, compiled by Dr. Tatham, the statistical superintendent in the registrar-general's office, the mortality from tuberculosis among the population of England and Wales has been reduced to wellnigh half of that which it was thirty years ago.

The death rate per million of the population of England and Wales from pulmonary tuberculosis was in—

1870	2,410	1893	1,468
1875	2,202	1894	1,385
1880	1,869	1895	1,398
1885	1,770	1896	1,307
1890	1,682		

These figures are perhaps the best answer to the question asked at the head of this chapter.

CHAPTER XXVII.

Can the Treatment of Consumption be Carried Out with Satisfactory Results Outside of an Institution?

This question, too, may be answered in the affirmative, for the cure of a consumptive patient is certainly also possible outside of a sanatorium. The conditions essential to success in such a case are that the social position of the patient and the general environments are such that all the hygienic and dietetic measures, so essential in the modern treatment of consumption, are at the disposal of the physician. The latter, however, though he may be well trained and exceedingly skilful, cannot hope for success unless the patient is obedient and willing to carry out every detail of the treatment.

Sanatorium at Home.

We give here an illustration (Fig. 22) of how the patient in his own house may arrange for permanent open-air treatment by building a small addition with galleries and awnings where he can spend the greater part of the day, and where in warmer weather he may sleep at night. Another simple method for carrying out the rest

cure in the open air might be accomplished in the following manner: A large beach chair of wicker-work, such as is seen at our fashionable sea-side resorts, is procured. After the seat has been removed the inner walls are lined with padding. A reclining chair is placed with its back in the interior, and the whole arranged so that the patient is protected from the wind and sun. There the patient installs himself for the day, with his books and writing materials at his side placed on a little table, on which his meals may also be served. Being light, the whole can be shifted

FIG. 22.—Arrangement for Open-Air Treatment at Home.

whenever the wind changes and according to the different time of day, so that the invalid's body may be bathed by the rays of the sun, while his head remains in the shade (Fig. 23).

Poorer patients, who for financial reasons cannot have such conveniences and who cannot be received in a sanatorium, must be advised to ask the help of a physician, and under his guidance imitate as far as possible and practicable the sanatorium instalment and treatment at home. During the day the lounge or reclining chair should be moved near the open window if there is no porch or balcony. In summer, or on not too cold or windy days in win-

ter, the patient may be placed, warmly wrapped, on his chair on the flat roof, protecting his head from the sun by an umbrella or a small, improvised tent. If there is a yard or garden, a small platform of boards may be arranged for the chair in a spot sheltered from the wind. A plain steamer chair, padded with a quilt or blanket, will answer the purpose just as well as a costly reclining

FIG. 23.—Rest Cure at Home.

chair. How to arrange for the cold-water treatment at home, we have already described on page 34.

The hygienic precautions concerning the expectoration must, of course, be carried out in the private home as rigorously as in the institution. Thus, if the patient has an earnest determination to do his duty, confidence in his physician, and the good will of the friends and relatives who live with him, it is possible to make even a modest home temporarily suitable for the sanatorium treatment.

CHAPTER XXVIII.

What can Philanthropists and Other Men and Women of Good Will Do to Help Combat Tuberculosis as a Disease of the Masses?

In Chapter XXV. we have spoken of the most urgent need of sanatoria for the consumptive poor. These institutions are particularly wanted in large centres of population. In nearly all of our large cities there are thousands of poor consumptives living without care or treatment in their dark, filthy tenement-houses, and spreading their disease to their kin and neighbors. Perhaps not one of all the great cities of the Union at the present time can offer sufficient hospital facilities for the treatment or isolation of these unfortunate people. A very large percentage of these patients could be cured or restored to health and made breadwinners of their families if they were taken away from their unhygienic surroundings in time and received proper treatment in a sanatorium.

What great good wealth may do in this respect, how much misery and suffering it may alleviate, and how many lives it may thus save, needs hardly any further demonstration.

Need of Sanatoria for Children.

But, besides the sufferers from pulmonary tuberculosis, there is a large class of sufferers, especially among the children of the poorer classes, who are afflicted with other forms of tuberculous disease, particularly scrofula, and joint and bone tuberculosis. How very prevalent these scrofulous and tuberculous diseases are among children people in general have scarcely an idea. In Berlin, Germany, careful statistics are kept concerning the daily attendance of the children at the public schools. In one of them it was found that out of 125 boys and 132 girls who did not attend school regularly, not less than 114 of the former and 115 of the latter suffered from tuberculous or scrofulous troubles.

We have already spoken on page 63 of the excellent result obtained in the treatment of tuberculous and scrofulous children in the sea-coast sanatoria of France, Germany, Holland, and Italy. The climate at the sea-shore, in addition to good nutrition and cold

and warm sea-baths, seems to be particularly favorable for the cure of scrofula and tuberculosis in children. Institutions for this treatment, like sanatoria for consumptive adults, are important factors in combating tuberculosis as a disease of the masses. The creation of such institutions in our own country cannot be too warmly recommended to those who wish to help suffering little children.

The cure of tuberculosis in its various forms can be accomplished only by a thorough hygienic and dietetic treatment under strict medical supervision, in sanatoria, or, if circumstances permit, at the home of the patient.

General Causes of Tuberculous Diseases.

The prevention of tuberculosis as a disease of the masses, on the other hand, especially in the form of pulmonary tuberculosis or consumption, must be sought in combating the causes. In ignorance, lack of light, air, and sun, unhealthy tenements, unclean linen, lack of proper or sufficient food, excesses of all kinds, and, above all, in the abuse of alcoholic beverages, must we recognize to-day the most important factors in the propagation of the disease.

To combat the ignorance in regard to hygienic modes of life in general and the hygiene of tuberculosis in particular, among the masses, must be the duty of the educated. Physicians, teachers, employers, and all men and women who have time, means, talent, and inclination, should unite to educate the masses by lectures and the distribution of pamphlets concerning the nature of diseases, particularly tuberculosis. The formation of societies for the prevention of tuberculosis should be encouraged in every State of the Union. The State and municipal governments, boards of health, or other sanitary authorities should not only favor these useful enterprises, but gladly co-operate in order to increase their usefulness.

To give to the poor people of large cities more air, light, and sun, it is essential not only to provide for good sanitary dwellings, of which we shall speak in detail in the next chapter, but also to create a number of parks and playgrounds, by public means or private philanthropy, particularly in the more densely populated districts. Such parks and breathing places are justly called the lungs of a great city.

Cleanliness and the beneficent influence of a bath must be practically taught to the ignorant. While it would be desirable that every family should have its own bathroom, it will be some time yet before this ideal condition will be obtained. In the mean time the establishment of a number of public baths, of which we made mention on page 43 in speaking of labor colonies, will be one of the best means to improve the condition of the poor in this respect and render them less liable to disease. As an example of the excellent work of such public baths I give an extract from the report of the New York People's Bath of last year. These baths were erected and are maintained and managed by the Association for Improving the Condition of the Poor: "The People's Baths are located at No. 9 Centre Market Place, New York. They were opened in August, 1891. The building and its equipment have cost about $28,000. It is situated on land for which no ground rent is charged. The city furnishes the water free. The building is constructed of enamelled brick and iron, and contains twenty-six baths, twenty-three of which are spray baths (seventeen for men and six for women). The other three baths are tubs for old women and children. On the second floor are living quarters for the superintendent, and in the basement the steam plant and laundry. The cost of a bath is five cents, which includes a separate piece of soap and a towel. Last year (1899) the baths surpassed all previous records, and have paid their operating expenses. The result of the year's work shows a credit balance of $137.01. The total number of bathers was 120,347, an increase over the previous fiscal year of 4,662. All monthly and daily records of number of bathers were also surpassed. In July there were 17,452 bathers, and on July 22d the number was 1,175.

Public Baths.

"The total operating expenses were $5,571.99, and the total receipts $5,709. No more interesting attempt to better the conditions under which the tenement population live has ever been made than the People's Baths. Their record for the past eight years demonstrates that habits of cleanliness can be instilled into those occupying the very worst quarters of the city. The success of the baths is also largely due to the fact that they have been conducted strictly on a business basis, the patrons feeling that they

have given a reasonable equivalent for the services and accommodations extended them."

Of course, these establishments, in order to be truly useful, should be open all the year round, all day and in the evenings, and to men, women, and children.

Some Causes of Bad Nutrition.

The causes of insufficient and bad nutrition, while they have often to be sought in the economical and social condition of the community, which we cannot discuss here, are just as, and perhaps more, frequently to be found in ignorance and inexperience. To make a good, plain, healthy, and tasty meal with relatively little expense is an art which must be taught to the young wife, leaving the factory or the position in the store to enter upon the duties of a housewife. Here is a field for noble-minded and experienced women who have made the art of cooking a study. By imparting their experience to their less fortunate sisters, they will make a new household lastingly happy.

Of course, the establishment of public eating houses, where especially the unmarried people of the working classes can obtain good and plain meals for a nominal price, is also a necessity. In connection with the subject of malnutrition, we wish to say one more word concerning poor school-children, especially in large cities. The majority of them very rarely go home for luncheon, and the provisions they bring along from home are often of the most meagre kind. In some cities of Germany the experiment has been made to provide these poor children with a lunch of good meat sandwiches and a glass of milk. The result of this most praiseworthy work among children badly fed at home has been simply surprising. Nearly every one of them gained in weight within a month's time, and all of them were certainly made happier and capable of doing better work at school.

Alcoholism and Tuberculosis.

Now one more word concerning alcoholism or drunkenness. There is no doubt that alcoholism must be considered the greatest enemy of the welfare of a nation, the most frequent destroyer of family happiness, the ruination of mind, body, and soul, and certainly the most active co-operator of the deadly tubercle bacillus or germ of tuberculosis (consumption).

To combat alcoholism (drunkenness or intemperance) requires

above all education. Extreme prosecution and fanatical laws will do little good. From early childhood the dangers of intemperance and its fearful consequences should be taught. In schools and at home the drunkard should be pictured as the most unhappy of all mortals. While the very moderate use of feebly alcoholic drinks, such as light beers, may be considered as harmless to adults when taken with their meals, alcohol should never be given to children even in the smallest quantities.

In families in which there is a fear of hereditary transmission of the desire for strong drink, even the mildest alcoholic drinks should be absolutely avoided. It would also be best if all people so predisposed, or who may have acquired only the occasional desire for drink, would never smoke, for experience has taught that attacks of dipsomania (periodical sprees) are often caused by an excessive use of tobacco. The young man starting out in life should take with him the moral training which will enable him to be a gentleman, and be considered a polite gentleman, though he absolutely refuses ever to enter a liquor saloon in order to treat or be treated to drink. It is this treating habit—alas! so prevalent in our American society—which has ruined many a young man and made him a moral and physical wreck. The creation of tea and coffee houses where warm, non-alcoholic drinks including bouillon are sold in winter and cool ones in summer, are to be encouraged. It would be of additional advantage if some of these houses could also offer healthful amusements for old and young. Temperance societies, which through intelligent propaganda help to combat the fearful evil of alcoholism, should receive encouragement from everybody.

CHAPTER XXIX.

How Might the Tuberculosis Problem in the United States be Solved by Judicious Legislation and a Combination of Public and Private Philanthropy?

Presuming that there were in all the States sufficient regulations against the spread of tuberculosis from man to man, and that the laws against the propagation of tuberculosis by animals were uni-

form throughout the United States and enforced in the best possible manner, we would, for further work, suggest the following plan, more particularly for the larger centres of population:

Just as there exists in nearly all states or municipalities a commission or a number of special examiners for the purpose of determining who is a proper subject for state care in an asylum for the insane, so should there exist a commission for the determination of admission to a municipal or state institution for consumptives. Such a commission, composed of a certain number of general practitioners and health officers, should be aided in its work by the charity organizations. Each case should be investigated by a combined committee of physicians and laymen, for the following purposes:

1. To determine the applicant's condition by a medical examination.

2. To visit his home if he has been found tuberculous, and to institute such hygienic measures as seem necessary (distribution of pocket spittoons, disinfectants, etc., gratuitously if the patient is poor).

3. To examine the other members of the family, in order to find out if any of them have also contracted the disease, and, if so, to counsel proper treatment.

4. To report in full to the sanitary authorities concerning the condition of the patient's dwelling. Its renovation or even destruction may be imperative when it is evident that tuberculosis has become "endemic" there, owing to the condition of the soil or to other sanitary defects.

5. To determine the financial condition, whether the patient is or is not able to pay, and whether or not by his being taken to an institution the family will become destitute.

If the latter should be the case, it would be necessary for the municipality to provide for the family. In many cases a letter of inquiry, sent to the former medical attendant of the patient, would materially aid the work of the investigation committee.

Any individual should have the right to present himself for examination, and every physician should be at liberty to recommend any person for examination to the board of his precinct or district.

The institutions needed to carry out this plan would be:

1. A centrally located reception hospital and dispensary. The dispensary should treat the ambulant tuberculous patients, whose admission into the sanatorium is impracticable or has to be delayed for want of room. These dispensaries should also serve the patient discharged from the sanatorium as a place to seek counsel, and thus aid in his continued improvement and guard against the possibility of a relapse.

2. One or several city sanatoria, located in the outskirts, and if possible in a somewhat elevated region, where the atmosphere is known to be pure. Here all patients should pass through a preparatory sojourn before being sent to the mountain sanatorium. The more advanced cases would all be retained here.

3. One or several mountain sanatoria at no greater distance from the city than from three to five hours by rail, at an altitude, if possible, of between one thousand and two thousand feet, on porous ground, with southern exposure, as nearly as possible protected from the coldest winds by higher mountains, and preferably surrounded by a pine forest. A farm in the vicinity, where the thoroughly convalescent patients could do light work, might make the institution in a measure self-supporting. To this place the selected incipient and the improved cases from the city sanatorium should be sent to complete their cure. To the mountain sanatorium there should also be attached a department for children suffering from pulmonary tuberculosis.

4. Several sea-side sanatoria for the treatment of children afflicted with tuberculous diseases of the joints and other tuberculous (scrofulous) manifestations.

5. A maternity sanatorium where tuberculous mothers should be received a few months previous to their confinement, and surrounded by the best hygienic and dietetic care. They should also remain in the sanatorium for some time after childbirth. It is only by taking away these mothers from their unsanitary tenement homes, and placing them under constant medical supervision in such an institution, some time before and after their confinement, that the fearful mortality among tuberculous mothers after childbirth can be reduced.

The beneficial effect on the woman's and child's constitutions through such an arrangement can hardly be over-estimated. Leaving aside the physical well-being thus largely assured to mother and child at a period when their organisms need the most tender care, the hygienic training which the mother will have received in such an institution will be of lasting utility to herself and child, to the family, and to the community.

Maternity Sanatoria.

These maternity sanatoria need not be situated at a great distance from the city. All that would be essential is that they should be erected on good, porous ground, preferably somewhat elevated, and in a locality where the atmosphere is as pure as possible. The buildings should be constructed according to the requirements of modern ways of treating women in childbirth, and with ample facilities for rest cures, sun baths, and the other equipments of a sanatorium for tuberculous invalids.

Tenements and Tuberculosis.

Another important work toward the solution of the tuberculosis problem which might be accomplished by a combination of public and private philanthropy, in addition to legislative measures, is the multiple creation of model tenement houses, particularly in large centres of population. There should everywhere be legislation to make the erection of any but model tenement houses impossible, and the law should at the same time empower the sanitary authorites to inspect all existing tenements, and if there are any which are unfit or unsafe for human habitation owing to lack of air, light, or ventilation, they should be condemned. As has been said before, if a thorough renovation will not make them sanitary, to tear them down will be the only remedy.

Overcrowding in tenement houses should be considered a crime, and the owner should be held responsible for it. A family of from six to ten living in three rooms, of which perhaps only one receives direct light and air, cannot possibly remain in a good state of health for any length of time. It is the dreary and cheerless room of the tenement dwelling which often drives the wage earner to the saloon. He finds light and life in the saloon and becomes indifferent to home conditions. Give the workingman a pleasant, clean, healthy, and comfortable home, and the rumshop will have less attraction for him. He will be a better husband, father, and citi-

zen. The money formerly spent for liquor will go to the butcher and baker for the better nutrition of his family, and underfeeding (another important agent in preparing the field for tuberculous diseases) will be materially lessened. A very praiseworthy movement in this direction was recently inaugurated in New York by the creation of a tenement-house commission, which has for its purpose the improvement of the housing of the poor by the creation and enforcement of better tenement laws.

Overcrowding of Prisons, Asylums, Lodging Houses, etc.

Overcrowded prisons, asylums, almshouses, schools, barracks, public homes, lodging houses, etc., must also receive the attention of the sanitary authorities. The often crowded and unclean sailors' boarding houses must not be overlooked. Enough cubic space per individual, more systematic ventilation, and the isolation of tuberculous invalids are the remedies which must be applied.

Ship-builders, ship-owners, and captains should bear in mind that the intensely crowded quarters to which the average sailor is confined during his hours of rest and sleep are absolutely detrimental, and even the outdoor life during the hours of work cannot counteract the deleterious influence which the vitiated air of the forecastle exerts on the health of the seaman. Of course, we are aware that the space given to each individual on board ship must be, of necessity, limited; still there can be some improvement, and the ventilation can be made more perfect. For the very reason that sailors have to live in crowded quarters the danger of infection on board ship is very great. A tuberculous sailor still at work is almost certain to infect his comrades. But shipboard is not the only place where sailors are exposed to the disease. When on shore they mostly frequent and sleep in houses where the accommodations consist of bunks and straw, and where sanitation is so neglected that they are in still greater danger of contracting disease. To prevent the spread of infection among sailors there is but one remedy, and that is the regular periodic examination of every sailor on board ship and the exclusion from service of individuals suffering from pulmonary tuberculosis.

Lastly, the physicians, statesmen, and philanthropists interested in the solution of the tuberculosis problem have, besides working for the better housing of the poor and the creation of special insti-

tutions for the treatment of consumptives, an additional mission to perform. The tide of emigration from village to city should be reversed. If tuberculosis has made its appearance in a family living in a large city, the physician should exert all his influence to induce especially the younger members to migrate to the country and seek outdoor occupations. Statesmen should protect the interests of the farmer, so that farming will have more attraction to the rising generation than it has had in the last few decades; and philanthropists should aid the statesmen by endowing institutions for instruction in scientific and profitable agriculture, and also by providing healthful amusements, good libraries, and other educational institutions in country districts, thus making living outside of large cities more interesting and attractive to young people; in short, the love of nature and life in the open air should be more cultivated. In the proportion in which this is done tuberculosis will decrease.

Emigrati from City Country

Life in tl Open Ai

The creation of schools of forestry in connection with the preservation and cultivation of forests in many States where a wasteful destruction of trees is now carried on, would give useful and healthful employment to a number of people, as well as render the region more healthful. It would offer attractive careers to young men seeking to overcome hereditary or acquired tendencies to tuberculous diseases.

CHAPTER XXX.

Conclusions.

The author of this essay is aware that much that has been asked in the preceding pages may appear at first too difficult to be realized; nevertheless, he is convinced that by the earnest co-operation of all interested in the solution of the various problems, the task will prove far easier than might be anticipated. In view of the great mortality and fearful ravages of the disease in question, his hopes for a more rigorous crusade against this common foe of all mankind are justified. He is optimistic enough to believe even in an ultimate eradication of the disease.

If any community is visited by an acute contagious disease,

smallpox for example, of which a few people may die, everybody is up in arms; while consumption, a far more prevalent disease, demanding thousands of lives every year, is treated wellnigh with indifference. Yet all who have made the disease a study have for years come to the conclusion that tuberculosis, especially in its pulmonary form, is not only a preventable disease, but one which can in the majority of cases be completely and lastingly cured. It is certainly within the power of man, living in a civilized country, such as the United States, where so much intelligence, wealth, prosperity, and philanthropy prevail, to combat tuberculosis as a disease of the masses most successfully.

All that is required to attain this goal is the combined action of a wise government, well-trained physicians, and an intelligent people.

SUPPLEMENT.

Home Hygiene to Prevent Tuberculosis.

Tuberculosis may be called a dust and indoor disease. The less dust, the less tuberculosis. The less people live in an indoor atmosphere, the less are they liable to contract this disease.

Tuberculosis an Indoor Disease.

How may the danger arising from dusting and sweeping be reduced to a minimum? To answer this question I cannot do better than to reproduce the excellent rules which were suggested to our New York Committee on the Prevention of Tuberculosis, by the distinguished Prof. T. Mitchell Prudden, of Columbia University.

Sweeping and Dusting.

"When you sweep a room, raise as little dust as possible, because this dust when breathed irritates the nose and throat and may set up catarrh. Some of the dust breathed in dusty air reaches the lungs, making parts of them black and hard and useless.

"If the dust in the air you breathe contains germs of consumption (tubercle bacilli), which have come from consumptives spitting on the floors, you run the risk of getting consumption yourself. If consumptives use proper spit-cups and are careful in coughing or sneezing to hold the hand or handkerchief over the nose and mouth so as not to scatter spittle about in the air, the risk of getting the disease by living in the same room is mostly removed."

"To prevent making a great dust in sweeping, use moist sawdust on bare floors. When the room is carpeted, moisten a newspaper and tear it into small scraps and scatter these over the carpet when you begin sweeping. As you sweep, brush the papers along by the broom and they will catch most of the dust and hold it fast, just as the sawdust does on bare floors. Do not have either the paper or the sawdust dripping wet, only moist.

How to Sweep Without Raising Dust.

"In dusting a room, do not use a feather duster, because this

does not remove the dust from the room, but only brushes it into the air so that you breathe it in; or it settles down and then you have to do the work over again.

Dry or Moist Cloths in Place of Feather Dusters.

"Use soft, dry cloths to dust with, and shake them frequently out of the window; or use slightly moistened cloths, and rinse them out in water when you have finished. In this way you get the dust out of the room."

"In cleaning rooms you should remember that dust settles upon the floors as well as on the furniture, and is stirred into the air we breathe by walking over them. You can easily remove all this dust in rooms which have bare floors, in houses, stores, shops, schoolrooms, etc., after the dust has settled, by passing over the floor a mop which has been wrung out so as to only be moist, but not dripping wet."

Vacuum Cleaning the Most Sanitary.

Thus we should clean our homes until the time comes when not only factories, public buildings, hotels, and schoolhouses, but also the homes of ordinary citizens, including the tenement-houses, can be cleaned by the hygienic pneumatic or vacuum cleaning process.

How may the air in our homes be rendered as fresh, pure, and sanitary as possible? In summer this problem is relatively easy. The windows and doors can be left open so as to make the air as fresh as that outside. The greatest difficulty is experienced in winter. The windows cannot be left open all the time then, but the rooms should be thoroughly and frequently aired whether there is sickness or not. I have already referred in Chapter XII., page 39, to the unwholesome custom of heating our American dwellings altogether too much and producing thereby too dry an atmosphere.

Possible Results of too Dry and Overheated Atmosphere.

Experience has proven that we can be perfectly comfortable in a temperature of 65° F. and even a little lower, provided that the relative percentage of moisture is 60. If this moisture falls to 30 or to 20 per cent, then the dry throat, dry nose, and dry skin are in evidence. The explanation is simple. The dry air absorbs the moisture from the body and causes discomfort. The drying of mucous membrances in this way lays them open to the invasion of the organisms causing colds, grippe, pneumonia, and tuberculosis. On page 39, Chapter XII., I have illustrated an apparatus called a "humidifier," and suggested various other ways to render the atmosphere moist enough to be sanitary. I reproduce here an instrument which will be helpful in determining the relative humid-

ity. It has been strongly recommended by the Indiana State Board of Health, which published it with the following description in its monthly bulletin under the name of Direct Reading Hair-Hygrometer. Fig. 24 is a picture of a direct reading hair-hygrometer. Every household, every schoolroom, and every workroom should have one of these instruments, for it is a fact that the humidity of the air is of more importance than the temperature This hygrometer is not absolutely accurate, but is sufficiently so for practical purposes. Indeed, it is as accurate as the ordinary thermometer. If the matter of humidity was carefully attended to by every one, there would be a decided improvement in the general health and a very great lessening of diseases of the air passages.

FIG. 24.—Direct Reading Hair-Hygrometer.

In Chapter IV., directions concerning the disinfection of rooms, furniture, wearing apparel, etc., used by a consumptive have been explicitly given. To secure absolute certainty we would add that after every disinfection, be it for tuberculosis or for disease predisposing to tuberculosis such as measles, scarlet fever, whooping cough, epidemic grippe, diphtheria, smallpox, pneumonia or typhoid fever, a thorough airing and scrubbing with soap and water, of floor, walls, furniture, and wearing apparel are absolutely essential. If the walls are papered and do not permit a thorough washing they should be repapered. By thorough disinfection followed by an equally thorough cleaning and airing home hygiene can be made a real barrier to the spread of many infectious diseases. Lastly filtering or boiling all ordinary drinking water will serve as additional preventative.

Disinfection, Scrubbing, and Airing. Pure Drinking Water.

SCHOOL HYGIENE AS A FACTOR IN THE PREVENTION OF TUBERCULOSIS.

The school board, or board of education as it is called in some localities, in choosing a site for a school should bear in mind that the most suitable locality is a somewhat elevated region, where the streets are wide and the surrounding houses not too high and not

too close together, and where the traffic is not too heavy. About the construction of a modern and model schoolhouse much could be said. The essentials of such construction are well known to all sanitarians and up-to-date architects, still in the interest of the cause I may be permitted to quote here a portion of a law which has recently been enacted in the Legislature of New York in reference to sanitation of schoolhouses. "No schoolhouse shall hereafter be erected in any city of the third class or in any incorporate village or school district of this State, and no addition to a school building in any such place shall hereafter be erected, the cost of which shall exceed five hundred dollars, until the plans and specifications for the same shall have been submitted to the commissioner of education and his approval endorsed thereon. Such plans and specifications shall show in detail the ventilation, heating, and lighting of such buildings. Such commissioners of education shall not approve any plans for the erection of any school building or addition thereto unless the same shall provide at least fifteen square feet of floor space and two hundred cubic feet of air space for each pupil to be accommodated in each study or recitation room therein, and no such plans shall be approved by him unless provision is made therein for assuring at least thirty cubic feet of pure air every minute per pupil, and the facilities for exhaustion of the foul or vitiated air therein shall be positive and independent of atmospheric changes. . . . All schoolhouses for which plans and detailed statements shall be filed and approved, as required by this act, shall have all halls, doors, stairways, seats, passageways, and aisles, and all lighting and heating appliances and apparatus, arranged to facilitate egress in case of fire or accident, and to afford the requisite and proper accommodations for public protection in such cases. All exit doors shall open outwardly and shall, if double doors be used, be fastened with movable bolts operated simultaneously by one handle from the inner face of the door. No staircase shall be constructed with winding steps in lieu of a platform, but shall be constructed with straight runs, changes in direction being made by platforms. No door shall open immediately upon a flight of stairs, but a landing at least the width of the door shall be provided between such stairs and such doorways."

Law in the State of New York Concerning Construction of Schoolhouses.

In relation to the prevention of tuberculosis I would suggest only a few points. Where the site or locality does not permit of having a large playground, a roof-garden which can be covered in

Playgrounds and Roof-gardens.

CALIFORNIA STATE BOARD OF HEALTH SACRAMENTO

winter is absolutely necessary. Instead of our American windows, which can only be opened to one-half of their extent, I should wish to see French or casement windows in every schoolhouse, or windows sliding into the wall, or those that turn on a pivot, all of which permit twice the amount of foul air to go out and of good air to come in that our ordinary windows do. Heating and general ventilation of schoolrooms should, of course, be of the most improved kind. The walls and woodwork of schoolrooms should be plain, to make the accumulation of dust virtually impossible and the cleaning easy. All corners should be rounded off, and the walls painted with oil paint. The interior equipment—that is to say, the school furniture, benches, and desks—should be so arranged that they can easily be moved or folded together, so that a thorough cleaning of the floors is made possible after each daily session. It goes without saying that the drinking-cup should be replaced by the hygienic drinking-fountain, which makes the use of a cup unnecessary, and thus eliminates one method of transmission of microbic disease.

Internal Equipment of Schoolrooms.

Sanitary Drinking Fountains.

Every public school should have a well-equipped gymnasium, and a swimming-tank with constantly running fresh or salt water, warmed to a suitable temperature in winter. Each pupil should be given the opportunity to bathe several times during the week. To learn to swim should be made obligatory, and every class should be supervised by a competent swimming master.

Gymnasium and Swimming Tank.

I am convinced that the public school which has a well-equipped swimming establishment and which makes regular bathing and instruction in swimming obligatory for every pupil will not only have fewer cases of infectious and contagious diseases, particularly scrofula and tuberculosis, but that the intellectual and moral status of its pupils will be higher.

The duties of the superintendent of a public school in the prevention of tuberculosis are manifold. In arranging the curriculum he should bear in mind never to push the intellectual training to the detriment of the bodily development or physical welfare of the children in his school. There has been, and is yet, altogether too much overtaxing of the brain and the nervous system of our boys and girls in public and also in private schools.

Curriculum Should be Suited to Proper Mental and Physical Development.

The physician who has studied closely the beginning of tuberculous diseases knows that it is often at the period of entering puberty that the predisposed individual becomes most susceptible

to the invasion of the bacillus, particularly when additional strain is put upon the physical or mental system. This holds good of both sexes. A judiciously divided curriculum, interspersed with gymnastics, swimming, and as much outdoor instruction as possible, would seem to me a most important factor in the prevention, not only of tuberculosis, but of all indoor diseases and even nervous troubles.

Outdoor Instruction.

By outdoor instruction I mean not only botanizing tours and geological excursions, but also outdoor singing and outdoor recitation. I am convinced that outdoor singing and recitation, when the weather is neither too windy nor too cold, are most excellent means to prevent the development of pulmonary diseases. Breathing exercises, such as are described in Chapter XII. of this book should of course be instituted at least for a few minutes at a time every hour or two. The lessons in physiology and hygiene at school must be adapted to the age and understanding of the pupils. The teacher should, of course, be familiar with all the practical and feasible methods in vogue in regard to the prevention of tuberculosis as an infectious and communicable disease. The source of infection from indiscriminate expectoration, from coughing and sneezing in people's faces, from kissing on the mouth, and other unhygienic habits can be taught in simple words to the children of even the primary classes. A good method to impress these simple rules on school children, and thus prevent them from contracting tuberculosis during school life, is to have a printed leaflet given to each child. These leaflets should contain the do's and don'ts which are the alphabet in the prevention of tuberculosis in kindergartens, private and public schools, and colleges. For this purpose I have compiled the following:

SIMPLE RULES FOR SCHOOL CHILDREN TO PREVENT TUBERCULOSIS.

Every child and adult can help to fight consumption. School children can be helpful by complying with the following rules:

Do not spit except in a spittoon, a piece of cloth, or a handkerchief used for that purpose alone. On your return home have the cloth burned by your mother, or the handkerchief put in water until ready for the wash.

Never spit on a slate, floor, playground, or sidewalk.

Do not put your fingers into your mouth.

The A. B. C. for Children in the Prevention of Tuberculosis.

Do not pick your nose or wipe it on your hand or sleeve.

Do not wet your fingers in your mouth when turning the leaves of books.

Do not put pencils in your mouth or wet them with your lips.

Do not hold money in your mouth.

Do not put pins in your mouth.

Do not put anything in your mouth except food and drink.

Do not swap apple cores, candy, chewing gum, half-eaten food, whistles, bean-blowers, or anything that is put in the mouth.

Peel or wash your fruit before eating it.

Never sneeze or cough in a person's face. Turn your face to one side or hold a handkerchief before your mouth.

Keep your face, hands and finger-nails clean. Wash your hands with soap and water before each meal.

When you don't feel well, have cut yourself, or have been hurt by others, do not be afraid to report to the teacher.

Keep yourself just as clean at home as you do at school.

Clean your teeth with toothbrush and water, if possible, after each meal; but at least on getting up in the morning and on going to bed at night.

Do not kiss any one on the mouth or allow anybody to do so to you.

Learn to love fresh air and learn to breathe deeply and do it often.

These leaflets should be read at regular periods, say once a month, and explained and commented upon by the teacher. The children should be allowed to keep the leaflets and take them home to their parents.

Disinfections of Lead-pencils, etc.

In schools where slates and lead-pencils are given to the children and collected after school hours, these articles should be disinfected before they are again distributed to the pupils. Not only the spread of tuberculosis, but far more contagious diseases, such as measles, diphtheria, and scarlet fever, may be prevented among school children by this simple precaution. The custom in vogue in some schools of having every child use a suitable envelope, so as always to have the same pencil, while preferable to no precaution at all, is, in my opinion, not nearly so safe as a thorough disinfection.

On playgrounds and in corridors, elevated spittoons with automatic flushing devices and cover such as illustrated in Fig. 25,

should be placed here and there to remind the old and young never to expectorate on the ground.

An important point in the prevention of the disease under consideration among school children is that the school teacher should be familiar with the objective signs and symptoms of tuberculosis and the characteristics of a person predisposed to consumption.

Fig. 25. — Knopf-Thibert Elevated Self-Flushing Spittoon.

The symptoms have been described at length in the preceding chapters, XVIII. and XIX. The duties of the school physician should be a daily inspection of the children to avoid the propagation of acute infectious diseases including bronchitis and grippe; the constant supervision of the sanitary condition of the school buildings; regular visits to the gymnasium and the swimming-school; and, lastly, the most important function of all, the periodical examination of the chests of all pupils, teachers, and employees of the school. The weeding out of all individuals that might constitute a source of infection, or those whose treatment becomes an imperative necessity, and the advice to be given to the parents of a tuberculous child, will make the school physician a most important factor in the solution of the tuberculosis problem.

In the prevention of tuberculosis in childhood I have always looked upon the suppression of child-labor as one of the *prima-facie* necessities. While it is with a sense of deep humiliation that we must acknowledge that this curse to childhood is not yet entirely done away with in all our States, it is gratifying to note the ever-increasing progress toward its suppression.

Child-labor at Home is as Pernicious as that in Factories.

However, there is one kind of child labor which the law can only reach with difficulty, except as it has the co-operation of the school teacher and the school physician. I refer to those cases where cruel or thoughtless parents impose upon their often delicate children the fulfilment of household duties or the performance of manual labor which would task the strength of a grown person. The timid child will probably never complain; but when the teacher or school

physician suspects that the paleness, the stooping shoulders, and the tired, sad look are the results of excessive manual labors imposed upon the child by parents or guardians, it is his duty to investigate and interfere.

Luncheon for Poor School Children.

In schools located in the districts of the poor where under-feeding of the pupils not only often hinders the child from doing good school work, but actually predisposes to tuberculosis, I would suggest to the board of education a philanthropical enterprise in which the generous, good-hearted people of every community should gladly join. This is to provide these half-starved little ones with a luncheon of one or two meat sandwiches and one or two glasses of good milk. I am convinced that fewer will develop tuberculosis and scrofulosis and they will do better work at school and at home.

To avoid a pauperizing tendency, a few pennies may be charged for these lunches.

Provision for Tuberculous School Children and Teachers.

What shall be done with a tuberculous child whose presence in the public school may be a danger to his comrades, besides making his own recovery much more difficult? Municipalities and philanthropists should, after the example of the people in Europe, create seaside or country sanatoria where the tuberculous children may not only have the best possible chance of becoming cured, but also receive the necessary education.

On pages 63, 76, and 77 of this volume I have spoken at length of the prevalence of tuberculosis among school children and the admirable work which is accomplished in seaside sanatoria. Gratifying results have also been attained in inland institutions devoted to the treatment of tuberculous and scrofulous diseases of children. In such seaside or inland sanatoria for children the unfortunate teacher also, whether predisposed to tuberculosis or already in the earlier stages of the disease, may find suitable employment with the best possible chance for recovery.

Installation for the Sanatorium Treatment of Consumptives at Home.

In Chapter XXVII. the question "Can the treatment of consumption be carried out with satisfactory results outside of an institution?" has already been answered in the affirmative. On page 23, Chapter V., we described how the consumptive's room should be

Selection of Room for Tuberculous Patient.

arranged, and in this supplement it is our purpose to give additional suggestions in case the home treatment becomes necessary or desirable and show how the sanatorium treatment can be imitated as nearly as possible. First, one should bear in mind that the sunniest, best-ventilated, and most comfortable room of the house, preferably on a higher floor, is the best suited for that purpose. All superfluous furniture, dust-catching curtains, and fixed carpets should be removed, but the room must not be made cheerless. A few rugs, washable curtains, some cheerful pictures may well be allowed.

FIG. 26.—Dr. S. A. Knopf's Window-tent in Position, with Patient in Bed Looking through the celluloid window into the room, but breathing outdoor air only.

Description of Window-tent.

If the arrangements illustrated in Fig. 22 and Fig. 23 for outdoor sleeping at night and the rest cure in the open air by day be added, so much the better. This, however, will only be feasible in a few instances, and is not at all practicable in large cities, particularly in our apartment- and tenement-houses. To make the open-air treatment feasible by day and night even in the homes of the poor living in cities, I have devised what I call a "Window Tent." It consists of an awning, which, instead of being placed outside of the window, is attached on the inside of the room. It is so constructed that the air from the room cannot enter or mix with the air in the

tent. The patient lying in the bed, which is placed parallel with the window, has his head and shoulders resting in the tent (Figs. 26, 27, 28). By following the description (Fig. 29) closely it will be seen that the ventilation is as nearly perfect as can be produced with so simple a device. The tent is attached to the frame of an American window, but it does not quite fill the lower half. A space of about three inches is left for the escape of the warm air in the room. By lowering the window, this space can

FIG. 27.—Dr. S. A. Knopf's Window-tent Raised when Not in Use.

be reduced to one inch or less, according to need. On extremely cold and windy nights there need not be left any open space at all above the tent frame. The patient's breath will rise to the top of the tent, the form of which aids in the ventilation. The tent is constructed of a series of four frames, made of Bessemer rod suitably formed and furnished with hinged terminals; the hinges operating on a stout hinge pin at each end with suitable circular washers interposed to insure independent and easy action in folding the same, the Bessemer rod being hardened to make a stiff, rigid frame to insure its maintaining the original form.

The frame is covered with extra thick yacht-sail twill, properly fitted, and having elongated ends to admit of their being tucked in under and around the bedding to prevent the cold air from entering the room. The patient enters the bed and then the tent is lowered over him, or with the aid of a cord and a little pulley attached to the upper portion of the window he can manipulate the lowering and raising of the tent himself. Shutters or Venetian blinds, whether they are attached on the inside or on the outside of the window, can be utilized in conjunction with the window-tent as a screen to intercept the gazes of the neighbors, and in stormy weather as a protection. The bed can be placed by the window to suit the patient's preference for sleeping on his left or right side, so that he has the air most of the time in his face. Another advantage of the window-tent is that it will not attract attention from the outside. The bed being placed alongside of the window will be convenient for a majority of the poor who have small rooms. If, however, the bed must be placed at a right angle to the window, this can be arranged as well. A piece of transparent celluloid is placed in the front of the tent to serve as an observation window for the nurse or members of the family to watch the patient if this is necessary. It also serves to make the patient feel less outdoors and more in contact with his family, as he can, if he desires to, see what is going on in the room. If the bed must be placed at a right angle to the window, the observation glass can be put in on either side. It goes without saying that, as a rule, patients should not smoke; when, in exceptional cases, this can be allowed, the danger of the celluloid window becoming ignited must be impressed upon them and the greatest precaution urged. I prefer celluloid to glass for this purpose, because

FIG. 28.—View of Window-tent and Patient taken from the outside.

there is no danger of its breaking when the tent is raised and lowered.

Adjustment of Bedstead to Suitable Height.

If it is necessary to raise the bed to the height of the window sill, this can be done with little expense. If the bed is of iron, a few additional inches of iron piping can be attached to the legs by any plumber or one handy with tools; raising a wooden bed can be accomplished with equal facility. If the window-tent is to serve the patient only during the night, the tent can be pulled up and the bed moved away from the window during the day, and the window closed. Or the tent can be taken from the hooks and put out of the way.

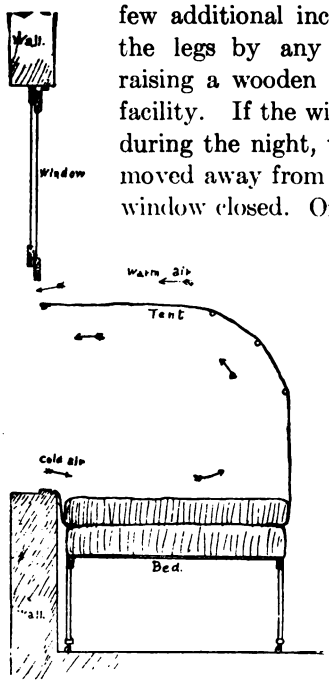

FIG. 29.—Diagram Showing Ventilation of Window-tent.

Advantages of the Window-tent in Winter.

The window-tent, of course, is of the greatest service to the consumptive sufferer in winter. If he is feverish, or his stay in bed is advisable, he can spend his entire time in the tent. If the people are poor, and the room where the consumptive sufferer lies serves as living-room for the rest of the family, the fact that the well members need not shiver while the patient takes his open-air treatment is of vital importance in many respects. While the room will not be quite as warm as if the window was entirely closed, it will be much warmer than if there was no tent in front of the window. Laying aside the economic advantages to a poor family when not obliged to heat more than one room, the patient feels that he does not deprive his loved ones of comfort and warmth and that he is less a burden and hinderance to their happiness. The other members of the family, on their side, feel that they can give the patient all the air he needs and that he need not suffer for their comfort.

Warm Covering But not too Heavy is Essential.

In winter the patient's bed must be covered with a sufficient number of blankets to assure his absolute comfort and warmth throughout the night. Still, the coverings should not be so heavy as to press down upon the body and make the patient feel uncomfortable or tire him. The tightly woven blanket is a better pro-

tection than the loosely woven one. To the poor, whose disposal of blankets is, alas, often very limited, it may be good advice to tell them to put several layers of newspapers between the coverings. *Outdoor Life* of December, 1905, recommends to sew half a dozen layers of paper between two layers of flannel. This certainly will make a cheap, light, and warm covering. In extremely cold weather, the patient while sleeping in the window-tent, should wear a sweater and protect his head and ears with a woollen cap, shawl, or woollen helmet, such as is shown in Fig. 30.

FIG. 30.—Woollen Hood or Helmet for Out-Door Sleeping in Cold Weather.

Some patients will often complain that the bright light awakens them too early in the morning, and that they have difficulty in going to sleep again. In such instances I counsel the patient to have some light-weight but dark-colored material (such as a black lisle-thread hose) to put over his eyes. This usually suffices to obviate the inconvenience caused by the bright light.

It will be observed that by merely closing the window and raising the tent the patient finds himself in the warm room, ready for his toilet, sponge-bath or massage as the case may be.

How the Window-tent can be Utilized for the Rest Cure on the Reclining Chair by Day.

When there is no garden, veranda, or roof, the window-tent can also be put into service for the rest cure during the day. The bed is moved away, and the reclining-chair put in its place. The latter can be raised to the necessary height by wooden blocks or a platform, and with the aid of blankets and comforters the air from the room can be excluded, and the patient, being in front of the open window, breathes only outdoor air. When beginning this aërotherapy, it is of course essential that it must be done gradually according to the susceptibility of the patient to the cold. It should, however, be impressed upon him that night air is as pure as day air. It is best to begin by placing him in the tent for a few hours at night, and a few hours during the day in the chair. The attending physician will regulate all this so as to get the patient gradually accustomed to live in the pure cold air day and night. A hot-water bottle for the feet either in bed or in the chair may often be necessary in extreme cold weather. The patient's feet must be kept warm if he is to benefit by the open-air treatment.

Historical Review of the Antituberculosis Movement in the United States.

First Sanatoria for Consumptives in the United States.

The first private sanatorium for tuberculous patients was established by Dr. J. W. Gleitzmann some thirty years ago (1875). It was followed some years later (1884) by the establishment of the first sanatorium for the consumptive poor through the personal efforts and devotion of Dr. E. L. Trudeau, of Saranac Lake. The first sanatorium established near a large city and without regard to any climatic advantages was the Sharon Sanatorium, near Boston. It was opened in 1890. It owes its existence to the enthusiasm and personal work of Dr. Vincent Y. Bowditch. The construction of the first State sanatorium for consumptives was authorized by an act of the Legislature of the State of Massachusetts in 1895. It is situated at Rutland, Mass., and was opened for reception of patients on Oct. 1, 1898.

Since then, and particularly during the past five years, private, State, and municipal sanatoria have been established in many of the States of the Union, or are at this moment projected or in course of construction.

In 1903 there was established at Lake Kushaqua, N. Y., an institution called the Stony Wold Sanatorium, which is unique of its kind.

It owes its inception to the thoughtful wives of two New York physicians, Mrs. James E. Newcomb and Mrs. Geo. F. Shrady; it is consecrated exclusively to the treatment of consumptive workingwomen and children and maintained mainly by noble-hearted women of wealth.

First Seaside Sanatorium for Tuberculous Children.

The first seaside sanatorium for tuberculous and scrofulous children, called Sea Breeze, was established a few years ago (1904), by the Society for the Improvement of the Condition of the Poor, and is situated on Coney Island.

First Special Tuberculosis Dispensaries.

The first dispensary class in the United States, devoted exclusively to the treatment of tuberculosis, was inaugurated in 1894 by Dr. Edward J. Bermingham of this City, at the New York Throat and Nose Hospital.

The first municipal dispensary for the treatment of the consumptive poor was established by the city of New York under the name of Clinic for Pulmonary Diseases of the Health Department.

It was started mainly through the initiative of Prof. Hermann M. Biggs, the General Medical Officer of the city, and was opened March 1, 1904. Since then dispensaries for tuberculous patients have been established in many of the larger cities of the United States.

First Society and First Committee for Prevention of Tuberculosis.

The first society for the prevention of tuberculosis was the Pennsylvania Society founded in 1892 by Dr. Lawrence F. Flick, who was also its first president. This society was the only active organization until five years ago.

The first Tuberculosis Committee of the Charity Organization Society doing educational and relief work was founded in 1902, largely through the efforts of Prof. Edward T. Devine, Ph.D., the general secretary of the Charity Organization Society and the Tuberculosis Committee's first secretary.

To-day there are at least 15 State organizations, and 60 city societies or committees all devoted to spreading the gospel of the preventability and curability of tuberculosis.

Tuberculosis Exhibitions and Their Educational Influence.

The first tuberculosis exhibition was held in Baltimore in January, 1904, under the joint auspices of the Tuberculosis Commission of the Maryland State Board of Health and the Maryland Public Health Association. This exhibition was an objective presentation of the history, distribution, varieties, causes, cost, prevention, and cure of tuberculosis. The next most important tuberculosis exhibition was held in New York from November 27 to December 9, 1905, at the Natural History Museum. The exhibition was organized under the auspices of the National Association for the Study and Prevention of Tuberculosis and the Committee on the Prevention of Tuberculosis of the Charity Organization Society of New York. Like the Baltimore exhibition it was planned as an educational measure in the wide-spread campaign against tuberculosis. It showed by means of models, photographs, charts, diagrams, etc., the main facts with regard to the disease and its prevention and cure. Cooperation from all parts of the country had been enlisted and a comprehensive demonstration of the facts had been installed. On the opening evening, addresses were made by the Mayor of the City of New York, the Hon. George B. McClellan; by Dr. Thomas Darlington, the Commissioner of Health; and by President Morris K. Jesup, of the American Museum of Natural History. Since then the same exhibition has become a traveling one, so that up to this date it has been shown in Boston, Philadelphia, Newark, Indianapolis, Chicago, Milwaukee, Grand Rapids,

Manistee, Detroit, Toronto, Cleveland, Cincinnati, Mexico City, San Antonio, Minneapolis, St. Paul and Providence. The attendance at these exhibitions has been a total of nearly five hundred thousand. Smaller exhibitions, organized by local committees, have been held in various cities and towns and materially helped in spreading the much needed information concerning the preventability and curability of tuberculosis.

Journals Devoted to the Anti-Tuberculosis Movement.

Four journals published in the United States are largely devoted to spreading information concerning the antituberculosis movement and sanatorium matters. These are: first, *Charities and the Commons*, published in New York under the auspices of the Charity Organization Society; second, *The Journal of the Outdoor Life*, published at Trudeau, N. Y., under the auspices of the Adirondack Cottage Sanatorium; the *Open Air Quarterly*, published by The Open Air Quarterly Company at the Pembroke Sanatorium, Concord, N. H., and lastly *The Vanguard*, the monthly bulletin of the Kentucky Anti-Tuberculosis Association.

National Association for the Study and Prevention of Tuberculosis.

As the culmination of the work done by many lay and medical men and women devoted to the noble cause, the American National Association for the Study and Prevention of Tuberculosis was established at a meeting in Philadelphia in March, 1904, and the organization completed in June of that year at the time of the meeting of the American Medical Association at Atlantic City. Dr. Edward L. Trudeau was elected President; Drs. William Osler and Hermann M. Biggs, Vice-Presidents; Dr. Henry Barton Jacobs, Secretary; and Gen. George M. Sternberg, Treasurer of the association. Among the honorary vice-presidents the association has the good fortune to count the Hon. Theodore Roosevelt, President of the United States, and the Hon. Grover Cleveland, ex-President of the United States. This society which welcomes as members men and women from all ranks of life who are interested in the solution of the tuberculosis problem, has its offices in New York City in the United Charity Building, 105 East 22d Street. Its present executive secretary is Prof. Livingston Farrand, M.D.

Tuberculosis Institutes.

The first Institute for the study, treatment, and prevention of tuberculosis was founded in Philadelphia, Pa., in 1903. It owes its existence to the sagacious munificence of the well-known philanthropist, Mr. Henry Phipps, formerly of Pittsburg, now of New York.

A second Tuberculosis Institute with purposes similar to those

of the Phipps Institute was established in Chicago in 1906 by such men as Drs. Babcock, Davis, Favill, Hektoen, Klebs, Sachs, etc.

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The first two Federal Sanatoria were established in the year 1899, one at Fort Stanton, the other at Fort Bayard, N. M. The first "Day Sanatorium," where patients are cared for from eight in the morning until five in the evening, was established in Boston under the auspices of the Association for the Control of Tuberculosis in 1905. The first Tuberculosis Class (treatment of poor patients by modern sanatorium methods at their homes) was established in 1905, by Dr. J. N. Pratt under the auspices of Emanuel Church of Boston.

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The first systematic work to treat tuberculous factory employees was inaugurated in 1906 by Dr. Frank T. Fulton of Providence, R. I.

terna- ıal Tu- culosis gresses.

Among those who represented the Medical Profession of the United States at the British Congress on Tuberculosis in 1901 were Frank Billings, W. J. Councilman, Charles Denison, George Dock, W. A. Hare, Henry J. Hartz, A. Jacobi, E. G. Janeway, H. M. King, H. P. Loomis, S. Weir Mitchell, J. H. Musser, Edw. O. Otis, M. P. Ravenel, Arthur R. Reynolds, F. C. Shattuck, G. B. Shattuck, E. S. Solly, A. K. Stone, Arthur R. Thomas, J. Tyson, W. H. Welch, J. C. Wilson. At the International Tuberculosis Congress which convened in Paris in 1905, this country was represented by an official delegation appointed by the President of the United States, composed of Drs. Beyer, Flick, Jacobs and Knopf. Various medical centers were represented by Brannan of New York, Lowman of Cleveland, McCarthy and Walsh of Philadelphia, Pottenger of Los Angeles, Evans of Chicago. At the closing session of this congress an invitation was given to have the next Tuberculosis Congress meet in Washington in the fall of 1908. This will be the first time that this distinguished body will honor our country by its presence, and the American Medical Profession as well as the Public at large should rejoice in the distinction of having the greatest minds engaged in the combat against the White Plague soon gathered in our Capital.

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The first executive order by a President of the United States with a view to preventing the spread of tuberculosis among the employees of the Government was issued by Theodore Roosevelt, Feb. 28, 1906.

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Finally, on Dec. 16, 1907, there was introduced in the House of Representatives, by Mr. Smith of Iowa, a bill (H R 9123) to create a Federal Tuberculosis Commission for the purpose of securing a uniform system of the prevention of tuberculosis in the United States.

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